






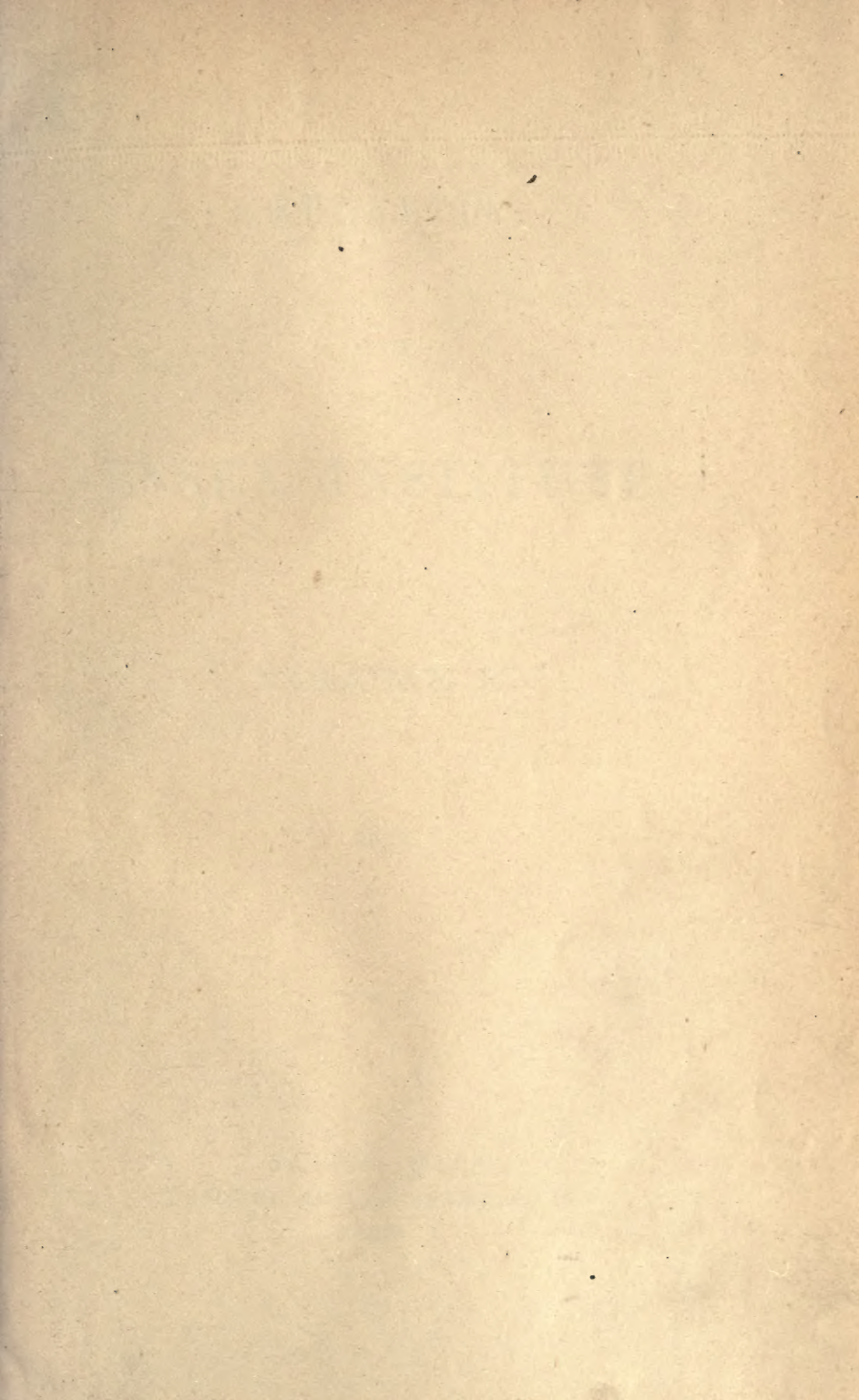


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BULLETIN



OF THE

ESSEX INSTITUTE,

VOLUME X.

1878.

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# BULLETIN

OF THE

## ESSEX INSTITUTE.

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MONDAY, JANUARY 7, 1878.

A REGULAR MEETING was held this evening. The PRESIDENT in the chair. Records of last meeting read. Correspondence and donations announced.

Mr. J. W. Thyng, of Salem, was elected a member.

Dr. GEORGE A. PERKINS, of Salem, made some remarks on Liberia, particularly of the region about Cape Palmas, where he had resided for nine years prior to 1848, connected with the Episcopal Missionary Station at that place.

After defining its geographical position he spoke of the peculiarity of that part of the western coast of Africa in having no harbors,—ships being obliged to anchor in the open roadstead, and all goods are landed either through the surf or in rivers which are entered over bars of sand at their mouths.

The country, though flat, was beautified by extensive forests of high trees, tangled with immense vines; the tall plumelike palms form a striking feature in the landscape, are very abundant and give the name to Cape Palmas.

Dr. Perkins gave an extended list of the productions of the country, which included those that are common to

tropical climes, coffee, cotton, and sugar being specially noticed,—remarking that, in a region where scarcely any clothing is required, and very little is to be expended for houses, if colonists from the United States did not thrive, the trouble was to be traced to the habits of the colonists, who desired to live by trading rather than by work; a better class of men, he was confident, would grow rich there.

The natives of that coast go by the name of Krumen among Europeans, the young men acting as sailors on board ships while on their voyages to this coast. Their conical huts, which were in many cases large and comfortable, and kept in good order, were grouped into towns or villages, each surrounded by a strong fence. The people were well formed, straight and muscular, wearing little clothing.

The religious ideas of the people take the form of Fetichism, with its accompaniments of witchcraft, devil worship, etc. Farming is the chief occupation of both sexes. Rice and cassada are extensively cultivated, and, with the fruit of the oil palm and fish, constitute their entire food. The men, when not engaged on the farms, build or excavate canoes, some of large dimensions; these are made from the cotton wood tree, which is abundant in their forests; others are of smaller size, for fishing. The trade upon the coast is altogether barter. The wealth of the natives consists in cows (which they exchange for wives, three cows and a few smaller articles being the price of a wife), sheep, goats, cloth, iron, brass rods (to be made into ornaments), powder and guns. The women are fond of beads, looking-glasses and other trinkets. Both sexes wash quite often, and paint themselves with white clay and often bright colors. Many curious customs were alluded to as common among this interesting tribe of Africans.



*A List of the Birds of Massachusetts, with Annotations.*

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BY J. A. ALLEN.

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DURING the last ten years not less than thirty-four species have been added to the avian fauna of Massachusetts. A few included in the earlier lists are now currently recognized as merely nominal, and a few others prove to have been inserted on erroneous identifications, or on unsatisfactory evidence. In view of the many additions and other changes made since the publication of the last general catalogue of the birds of the state, a new list seems desirable. In the present attempt to supply such a list I have endeavored to distinguish rigidly between such species as have been either actually taken, or observed under circumstances that render an erroneous identification almost impossible, from those of merely probable occurrence. I have hence separated the species below enumerated into several categories, namely: (1) species authenticated as birds of the state; (2) species of probable occurrence; (3) extirpated species; (4) species introduced, or probably introduced, by man's agency; (5) hypothetical and doubtful species.

The thoroughly authenticated species number three hundred and sixteen, besides several additional varieties. Of these about one hundred and thirty-five are known to breed within the limits of the state; some of them, however, somewhat sparingly and irregularly, or only in the more elevated portions of Berkshire County. About seventy fall into the class of accidental or extremely rare

visitors, and hence form, numerically, so far as individuals are concerned, no very important part of our fauna. The recorded instances of their capture, however, probably by no means fairly indicate the frequency of their occurrence.

The species indicated as of *probable* occurrence number twenty-four. One-fourth of these have already been taken on the very borders of the state (Suffield, Conn.), so that it seems almost finical to exclude them from the list of those known to occur in Massachusetts. Several others are southern species that have been taken in New Hampshire and Maine, to reach which points they in all probability passed through Massachusetts. The remainder are largely pelagic, and since they are of no interest or value to the sportsman, and are rarely accessible to the collector, the fact that we have no positive record of their capture within the state scarcely outweighs the strong probability of their occurrence here, as indicated by their known general range and habits. Hence at least seven-eighths of the species placed in the list of those probably occurring may certainly be considered as fairly entitled to be ranked as birds of the state. Adding to these four that have become extirpated raises the total number of species for the state to about three hundred and forty.

Several other species more or less commonly recognized as birds of the state I have considered as having no, or only very slight, claims to be so considered. Two of these (*Myiodiocetes minutus* and *Empidonax pygmaeus*) I regard as hypothetical; another (*Thaumatias linnæi*), as of doubtful record as taken in the state; another (*Passer domesticus*) is a well known introduced species, and two or three others may have escaped from cages.

The ornithology of the eastern portion of the state may now be regarded as pretty thoroughly known; that



of the central portion, though less well known, can scarcely differ much from that of the eastern. The region west of the Connecticut valley still offers an interesting field for investigation. Owing to the elevated, mountainous character of a considerable part of this area many species must regularly breed there that do not commonly pass the summer in the more easterly portions of the state. This, in fact, is known to be the case with a few, and is inferred for others. What is needed now to complete our knowledge of the ornithology of Massachusetts are exhaustive lists of the birds of at least two localities in Berkshire County,—one near its northern boundary and the other near its southern. It is to be hoped that not many years will pass before these desiderata will be supplied.

Within the last ten years three new species have been described from specimens first taken in Massachusetts. While it is hardly probable that others yet remain to be discovered, quite a number of stragglers from the far West and South, and possibly from the Old World, will doubtless yet be added to the already long list of accidental visitors.<sup>1</sup>

At the risk of extending these preliminary remarks somewhat unduly I append a brief historical summary of the literature of the subject under consideration. The

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<sup>1</sup> In this connection it may be interesting to note, as an indication of how rapidly our knowledge of the distribution of our birds is increasing, that of twenty-nine species withdrawn scarcely two years since from the list of New England birds, by one of our most eminent authorities, because he could find no satisfactory evidence that they had ever been taken in New England, over one-third have since been reinstated in consequence of their actual capture within these prescribed limits having been made known within this short period. Out of fourteen "challenged" land birds (Passeres and Waders) nine have already been placed on the record as actually taken, in some instances at several different localities, and in numbers ranging from three to five and even eight individuals. I mention this not in the spirit of criticism, but simply as an interesting fact, for I agree with the author in question that their previous record as birds actually taken in New England was, in nearly every instance, open to serious doubt.

first formal list of the birds of the state was prepared by Dr. Ebenezer Emmons, and published in 1833 in Prof. Hitchcock's "Report on the Geology, Mineralogy, Botany, and Zoology of Massachusetts" (pp. 545-551). This contained one hundred and sixty species, all but two of which were valid. Excluding the two synonyms, all but one (*Rhynchops nigra*) have since been confirmed as inhabitants of the state. The list was only very sparingly annotated, but symbols were employed to indicate whether the species were rare or common, resident or migratory, or whether known to breed in the state. This list, so far as it goes, is remarkably free from errors.

The same year (1833) Mr. Thomas Nuttall published a paper (written, it appears, in 1831) in the "Memoirs of the American Academy of Arts and Sciences" (2d Ser., I, pp. 91-106), entitled "Remarks and Inquiries concerning the Birds of Massachusetts," in which he added six valid, and three nominal, species to those mentioned by Dr. Emmons.

Four years later (in 1837) Dr. T. M. Brewer contributed to the "Boston Journal of Natural History" (I, pp. 435-439) a paper having the title "Some Additions to the Catalogue of the Birds of Massachusetts in Prof. Hitchcock's Report, etc." These additions comprised nominally forty-five species, about one-third of which were given on the authority of Audubon and Nuttall, and a number of others were included inferentially or on evidence of a somewhat traditional character. Three had been given (under other names) by Dr. Emmons, and two still lack confirmation as birds of the state. Only thirty-four were thus added to the number previously recorded by Nuttall and Emmons, raising the number at this time known to inhabit the state to one hundred and ninety-seven.



In 1839 appeared Rev. W. B. O. Peabody's "Report on the Ornithology of Massachusetts" (Rep. on Fishes, Reptiles and Birds of Mass., pp. 259-404), in which were enumerated two hundred and eighty-four species as occurring or *probably* occurring in the state. Of these, twenty prove to have been wrongly included (more than this number were given inferentially), and thirteen others are synonyms, leaving only two hundred and fifty-one valid and properly included species.

The next enumeration is that of Mr. F. W. Putnam's "Catalogue of the Birds of Essex County" (Proc. Essex Institute; I, pp. 201-231), published in 1856, in which two hundred and forty-five species are given as found in Essex County, while the Appendix adds forty-eight others as found in the state, making two hundred and ninety-three in all. The Essex County list includes but a single nominal species and only four that have not been confirmed by subsequent capture, or that can be considered as in the least degree open to doubt, while only two can be regarded as beyond question erroneously included. The supplemental list is compiled mainly from Peabody, Nuttall, and Audubon, and contains a dozen or more species that are either merely nominal, or that still lack confirmation as birds of Massachusetts, leaving about two hundred and seventy-five as the number of satisfactorily authenticated species.

In 1864 Mr. E. A. Samuels published his "Descriptive Catalogue of the Birds of Massachusetts" (Agric. of Mass., Sec'y's Rep. for 1863, App., pp. xvii-xxix), numbering two hundred and sixty-nine species. Of these, three are now regarded as nominal, and five or six others have not been confirmed as occurring in the state, although given by Peabody and some other previous authors. Deducting these leaves about two hundred and sixty, or eighteen less

than were correctly included in Mr. Putnam's list eight years earlier.

Almost simultaneously with the appearance of Mr. Samuel's list appeared my "Catalogue of the Birds found at Springfield, Mass., with Notes on their Migrations, Habits, etc.; together with a List of those Birds found in the State not yet observed at Springfield" (Proc. Essex Institute, IV, July, 1864, pp. 48-98). In this paper I gave one hundred and ninety-five as found at Springfield, and two hundred and ninety-seven<sup>2</sup> as inhabitants of the state. The Springfield list included one species (*Empidonax acadicus*) given erroneously, but which has since been taken within the area covered by the list, and some others have since been added. In the supplemental list three species were given that I now regard as synonyms, and some eight or ten others were included on the authority of Nuttall, Peabody, Audubon, Cabot, Bryant, and Brewer, of which there is no recent record of their capture, but which (with perhaps two, or possibly three, exceptions) are very likely to occur. Excluding, however, all these there still remain two hundred and eighty-two thoroughly authenticated as birds of the state. Of fifteen others mentioned as likely to occur, over one-half have since been added.

In 1868 was published a "Catalogue of the Birds of New England," by Dr. Elliott Coues, in which nearly all the species previously attributed to Massachusetts were included. The Great Auk (*Alca impennis*) was here for the first time recognized as a former inhabitant of Massachusetts, and the Barn Owl (*Strix pratincola*) and the Varied Thrush (*Turdus naevius*) were added in the Appendix from notes furnished by the present writer.

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<sup>2</sup>*Squatarola helvetica* was accidentally omitted from the Springfield list, though given in the classified list at the end of the paper; hence in my "summary" (p. 97) "296" should stand 297.



During the winter of 1869-70 I published additional "Notes on some of the Rarer Birds of Massachusetts" (Amer. Nat., III, Dec., 1869, Jan. and Feb., 1870), in which ninety-two species were formally referred to, and eight for the first time recorded as captured or observed within the state (exclusive of one included by error of identification, and four others perhaps not properly to be regarded as indigenous or naturally occurring species). Several species given in my previous list were now withdrawn. The number of species then stood nominally at three hundred and five, but in reality (or as judged by the standard I have adopted for my present list) two hundred and ninety-five.

Later in the same year appeared Mr. Maynard's excellent "Catalogue of the Birds of Eastern Massachusetts" (Naturalist's Guide, 1870, pp. 81-167), comprising nominally two hundred and ninety-nine species, but adding no new ones. Applying the same rules of exclusion that have been used in respect to the other before-mentioned lists the number becomes reduced to about two hundred and eighty-nine. Five or six were withdrawn as birds of *Eastern* Massachusetts, but otherwise the list includes all of the at that time authenticated indigenous birds of the state except four, known at that date as occurring only in the western part of the state.

Since 1870 about twenty-five species have been added, mainly through the investigations of Messrs. Brewster, Purdie, Deane, and Maynard, including three first described from birds taken within the state. No new separate enumeration of the birds of Massachusetts has, however, been since made, but in 1875 Dr. T. M. Brewer published a new "Catalogue of the Birds of New England" (Proc. Bost. Soc. Nat. Hist., XVII, July, 1875, pp. 436-454), in which, of course, those of Massa-

chusetts were included, embracing nearly all the additions made between the years 1870 and 1875, but generally without giving the date of capture or place of record. Of this list of three hundred and thirty-six species twelve are either explicitly or inferentially given as *not* found in Massachusetts; fourteen others are regarded in the following list as either purely nominal or as merely varietal forms of other species also occurring here; one is an introduced species, and another ("*Thaumantias linnæi*") I regard as improperly included; leaving three hundred and eight that may be regarded as birds of Massachusetts, though not of course always necessarily so implied by the phraseology of the list.

The following tabulated summary shows at a glance the number of species attributed to the state at different times since 1833, together with the number authentically recorded, the number still unconfirmed, and the number of merely nominal ones:—

HISTORICAL SUMMARY.					
	Whole number.	Synonyms.	Unconfirmed or not legitimately included. <sup>3</sup>	Fully authenticated.	Number added.
1833, Emmons,	160	2	1	157	—
1837, Brewer, <sup>4</sup>	205	5	3	197	40
1839, Peabody,	284	13	20	251	54
1856, Putnam,	293	7	11	275	24
1864, Samuels,	269	3	5	261	—
1864, Allen,	297	3	12	282	7
1870, Allen,	305	2	8	295	13
1870, Maynard,	303	3	11	289	—
1875, Brewer, <sup>5</sup>	322	3	11	308	13
1878, Allen,	340	—	24 <sup>6</sup>	316 <sup>7</sup>	8

<sup>3</sup> Embracing, among others, varietal forms here regarded as improperly accorded full specific rank.

<sup>4</sup> Inferentially, through additions to Dr. Emmons's list.

<sup>5</sup> Inferentially determined.

<sup>6</sup> Given as probably occurring, but not as yet fully confirmed.

<sup>7</sup> Plus four extirpated = 320.

### I. *Species of Authentic Occurrence within the State.*

[NOTE.—The asterisk (\*) at the left of a name indicates that the species is known to breed within the state. For the sake of brevity, the annotations are restricted to simply indication of season of occurrence and relative abundance, except in the case of the extremely rare or accidental visitors, respecting which the record of captures is brought down from 1864 to January, 1878. Only the original notice, however, is cited. My former catalogue gives the record of rare captures down to 1864 (see also Coues's "Catalogue of the Birds of New England" in Proceedings Essex Institute, vi, pp. 253-314, for the early record), so that my former paper, and the present, form together a full record in this respect.]

\*1. *Turdus migratorius* Linn. ROBIN. Abundant summer resident; a few remain during winter at favorable localities.

2. *Turdus nævius* Gmel. VARIED THRUSH. Accidental. As yet the only authentic record of its occurrence is its capture at Ipswich, in December, 1864 (Allen, Proc. Essex Inst., V, 1868, 312; Amer. Nat., III, Jan., 1870, 572; see further, on its supposed earlier occurrence in Massachusetts, Proc. Essex Inst., IV, 1864, 82).

\*3. *Turdus mustelinus* Gmel. WOOD THRUSH. Common summer resident except in the higher portions of Berkshire County.

\*4. *Turdus pallasi* Cab. HERMIT THRUSH. Spring and fall migrant, except in the mountainous portions of the state west of the Connecticut valley, where it is a common summer resident; occasionally breeds in other parts of the state.

5. *Turdus swainsoni* Cab. (= *T. swainsoni* et *aliciæ* auct.) OLIVE-BACKED THRUSH. Common spring and autumn migrant; probably breeds in portions of Berkshire County.

\*6. *Turdus fuscescens* Steph. VEERY; WILSON'S THRUSH. Common summer resident.

\*7. *Mimus polyglottus* Boie. MOCKING BIRD. Rare summer visitant, occasionally breeding, particularly in the Connecticut Valley.

\*8. *Mimus carolinensis* Gray. CAT BIRD. Abundant summer resident.

\*9. *Harporhynchus rufus* Cab. BROWN THRUSH. Abundant summer resident.

\*10. *Sialia sialis* Hald. BLUEBIRD. Abundant summer resident.

11. *Regulus calendula* Licht. RUBY-CROWNED KINGLET. Abundant spring and summer visitant.

12. *Regulus satrapa* Licht. GOLDEN-CRESTED KINGLET. Chiefly a winter visitant, occurring in variable abundance in different years, but usually more or less common. Perhaps breeds in portions of Berkshire County, as it has been reported to do in the Catskills (Trippe, Am. Nat., VI, 47).

13. *Poliophtila cærulea* Sch. BLUE-GRAY GNAT-CATCHER. Acci-



dental. One instance (Chatham, Nov. 18, 1877, *Deane*, Bull. Nutt. Orn. Club, III, Jan., 1878, 45). Several recent instances of its capture near Providence, R. I. (*Purdie*, Bull. Nutt. Orn. Club, II, Jan., 1877, 26; *Merriam*, Rev. Bds. Conn., 1877, 8.)

\*14. *Parus atricapillus* Linn. CHICKADEE. Common resident.

15. *Parus hudsonicus* Forst. HUDSONIAN CHICKADEE. Accidental. (Concord, Oct. 30, 1870, *Brewster*, Am. Nat., VI, 306. Also given as a bird of the state by Peabody, Rep. Orn. Mass., 402.)

\*16. *Sitta carolinensis* Gmel. WHITE-BELLIED NUTHATCH. Rather common resident.

17. *Sitta canadensis* Linn. RED-BELLIED NUTHATCH. Winter visitant. Not generally common. The doubtfully supposed instance of its breeding on the ground in Roxbury (May, 1877, recorded in Am. Nat., XI, 565), proves to have been a mistake, the eggs taken proving not to be those of that species.

\*18. *Certhia familiaris* Linn. BROWN CREEPER. Resident, but most numerous in spring, autumn and winter.

\*19. *Troglodytes aëdon* Vieill. HOUSE WREN. Rather common summer resident.

20. *Troglodytes parvulus* var. *hyemalis* Coues. WINTER WREN. Winter visitant; not common. Perhaps breeds in the higher mountainous portions of Berkshire County. (T. Martin Trippe gives it as breeding in the Catskills, Am. Nat., VI, 47.)

\*21. *Cistothorus stellaris* Cab. SHORT-BILLED MARSH WREN. Locally common.

\*22. *Cistothorus palustris* Baird. LONG-BILLED MARSH WREN. Common, like the preceding, at favorable localities.

• The Carolina Wren (*Thryothorus ludovicianus* Bon.) has been reported as occurring in Roxbury, in the summer of 1876, but no specimens were taken (*Minot*, Bull. Nutt. Orn. Club, I, Sept., 1876, 76; Land Birds and Game Birds of New England, 1877, 74).

23. *Eremophila alpestris* Boie. SHORE LARK; HORNED LARK. Winter visitant, chiefly along the coast, where it is generally common and sometimes abundant.

24. *Anthus ludovicianus* Licht. TITLARK; BROWN LARK. Spring and autumn visitant, in small flocks.

\*25. *Mniotilta varia* Vieill. BLACK-AND-WHITE CREEPER. Common summer resident.

\*26. *Parula americana* Bon. BLUE-YELLOW-BACKED WARBLER. Rather common summer resident.

\*27. *Helminthophaga ruficapilla* Baird. NASHVILLE WARBLER. Common summer visitant.

28. *Helminthophaga celata* Baird. ORANGE-CROWNED WARBLER. Rare or accidental. Only three instances of its capture thus

far on record. (Springfield, May 15, 1863, *Allen*, Proc. Essex Inst., IV, 1864, 60; Lynn, Jan. 1, 1875, *Brewer*, Proc. Bost. Soc. Nat. Hist., XVII, 439; Concord, Oct. 2, 1876, *Brewster*, Bull. Nutt. Orn. Club, I, Nov., 1876, 94. The only other New England records are Hollis, N. H., May 16, 1876, *Fox*, Forest and Stream, VI, 354; Isles of Shoals, *Murdoch*, Bull. Nutt. Orn. Club, III, Apr., 1878, —.)

**29. *Helminthophaga peregrina* Cab.** TENNESSEE WARBLER. Rare.

**\*30. *Helminthophaga chrysoptera* Baird.** GOLDEN-WINGED WARBLER. Summer resident. Not generally common.

**31. *Helminthophaga leucobronchialis* Brewster.** WHITE-THROATED WARBLER. Rare. One instance of its capture in the state thus far on record. Taken at Newtonville, May 18, 1870. (*Brewster*, Amer. Sportsman, V, 33, Oct. 17, 1874; Bull. Nutt. Orn. Club, I, 1876, 1. Original type of the species.) Three other specimens have thus far been recorded. (*Trotter*, Bull. Nutt. Orn. Club, II, 1877, 79; III, 1878, 79; Connecticut, *Brewster*, *ibid*, III, Apr., 1878, —.)

**\*32. *Dendroæa æstiva* Baird.** YELLOW WARBLER; SUMMER YELLOW BIRD. Abundant summer resident.

**\*33. *Dendroæa virens* Baird.** BLACK-THROATED GREEN WARBLER. Common summer resident.

**\*34. *Dendroæa cærulescens* Baird.** BLACK-THROATED BLUE WARBLER. Spring and fall migrant. Has been observed in summer in different portions of the state, and has been found nesting in Connecticut (two instances, June, 1874, *Jones*, Bull. Nutt. Orn. Club, I, 1876, 11). Also reported breeding in the Catskills (*Trippe*, Am. Nat., VI, 47).

**35. *Dendroæa coronata* Gray.** YELLOW-RUMPED WARBLER; MYRTLE BIRD. Abundant spring and autumn migrant. A few known to winter on Cape Cod. May breed in portions of Berkshire County.

**36. *Dendroæa auduboni* Baird.** AUDUBON'S WARBLER. Accidental. (Cambridge, Mass., Nov. 15, 1876, *Frazar*, Bull. Nutt. Orn. Club, II, 1877, 27.)

**\*37. *Dendroæa blackburniæ* Baird.** BLACKBURNIAN WARBLER. Common spring and autumn visitant, some remaining through the summer.

**38. *Dendroæa striata* Baird.** BLACK-POLL WARBLER. Abundant spring and autumn migrant.

**39. *Dendroæa castanea* Baird.** BAY-BREASTED WARBLER. Common spring and autumn migrant, varying greatly in abundance in different years.

**\*40. *Dendroæa pennsylvanica* Baird.** CHESTNUT-SIDED WARBLER. Common summer resident.

**41. *Dendroæa maculosa* Baird.** BLACK-AND-YELLOW WARBLER.

Common spring and autumn migrant. Has been observed a few times in summer, and may breed in the higher parts of Berkshire County.

**42. *Dendroeca tigrina* Baird.** CAPE MAY WARBLER. Rather rare spring and autumn migrant.

**\*43. *Dendroeca discolor* Baird.** PRAIRIE WARBLER. Common summer resident near the sea-board; less common in the interior.

**44. *Dendroeca palmarum* Baird.** YELLOW RED-POLL WARBLER. Abundant spring and autumn migrant; a few have been observed at favorable localities in winter.

**\*45. *Dendroeca pinus* Baird.** PINE WARBLER. Common summer resident.

**\*46. *Siurus auricapillus* Swain.** GOLDEN-CROWNED WAGTAIL; "OVEN-BIRD." Abundant summer resident.

**47. *Siurus naevius* Coues (*S. noveboracensis* auct.).** WATER WAGTAIL; "WATER THRUSH." Rather common spring and autumn migrant.

**48. *Siurus motacilla* Bon.** LARGE-BILLED WATER WAGTAIL. Rare or accidental. One record of its capture (Mount Tom, April 28, 1869, *Allen*, *Am. Nat.*, III, 557). Was found breeding near Norwich, Conn., by Mr. Ernest Ingersoll, in June, 1873 (*Am. Nat.*, VIII, 238). (The nest and eggs found by Mr. Ingersoll are in *Mus. Comp. Zool.*, Cambridge.) Mr. Merriam gives it as "not rare in Southern Connecticut, where it breeds regularly, and probably in considerable numbers" (*Rev. Birds Conn.*, 1877, 20).

**49. *Oporornis agilis* Baird.** CONNECTICUT WARBLER. Generally a rare spring and autumn migrant; sometimes abundant in autumn in the vicinity of Cambridge. Probably more common in other parts of the state in autumn than is generally supposed.

**\*50. *Geothlypis trichas* Cab.** MARYLAND YELLOW-THROAT. Abundant summer resident.

**51. *Geothlypis philadelphia* Baird.** MOURNING WARBLER. Rare spring and autumn migrant.

**\*52. *Icteria virens* Baird.** YELLOW-BREASTED CHAT. Rare summer resident. Several records of its nesting in the eastern part of the state.

**53. *Myiodioctes pusillus* Bon.** GREEN BLACK-CAPPED WARBLER. Rather rare spring and autumn migrant.

**54. *Myiodioctes canadensis* Aud.** CANADIAN WARBLER. Common spring and autumn migrant. Occasionally seen in summer, and probably breeds sparingly in Berkshire County.

**\*55. *Setophaga ruticilla* Swain.** REDSTART. Rather common summer resident.

**\*56. *Pyranga rubra* Vieill.** SCARLET TANAGER. Common summer resident.



**57. *Pyrranga æstiva* Vieill.** SUMMER REDBIRD. Accidental summer visitor. Several instances of its capture are on record. Mr. N. Vickary informs me that a specimen (hitherto unrecorded) was taken in Swampscot in June, 1866.

**\*58. *Hirundo horreorum* Barton.** BARN SWALLOW. Common summer resident.

**\*59. *Tachycineta bicolor* Cab.** WHITE-BELLIED SWALLOW. Common summer resident.

**\*60. *Petrochelidon lunifrons* Cab.** EAVE SWALLOW; CLIFF SWALLOW. Common summer resident.

**\*61. *Cotyle riparia* Boie.** BANK SWALLOW. Common summer resident.

**\*62. *Progne purpurea* Boie.** PURPLE MARTIN. Common summer resident.

**63. *Ampelis garrulus* Linn.** BOHEMIAN WAXWING. Accidental in winter. To the few previous records of its capture I here add another, a female, taken by Mr. N. Vickary at Lynn, Feb. 18, 1877.

**\*64. *Ampelis cedrorum* Baird.** CEDAR BIRD; CHERRY BIRD. Common summer resident; frequently seen in winter in roving flocks, and at localities where it finds food.

**\*65. *Vireo olivaceus* Vieill.** RED-EYED VIREO. Abundant summer resident.

**66. *Vireo philadelphicus* Cass.** PHILADELPHIA VIREO. Very rare. Only one instance of its capture thus far recorded. (Cambridge, Sept., 7, 1875, *Brewster*, Bull. Nutt. Orn. Club, I, 1876, 19. For a record of its occurrence in New England prior to Sept., 1876, see *Deane*, Bull. Nutt. Orn. Club, I, 74; see further, *Fox*, *ibid*, II, 78.)

**\*67. *Vireo gilvus* Bon.** WARBLING VIREO. Common summer resident.

**\*68. *Vireo flavifrons* Vieill.** YELLOW-THROATED VIREO. Rather common summer resident.

**\*69. *Vireo solitarius* Vieill.** SOLITARY VIREO; BLUE-HEADED VIREO. Common spring and autumn migrant; a few pass the summer here and breed.

**\*70. *Vireo noveboracensis* Bon.** WHITE-EYED VIREO. More or less common summer resident at certain localities.

**71. *Collurio borealis* Baird.** BUTCHER BIRD; GREAT NORTHERN SHRIKE. Rather common winter visitant.

**72. *Collurio ludovicianus* Baird (*C. ludovicianus* et *excubitoroides* auct.).** LOGGER-HEAD SHRIKE. Accidental. Several recent records of its occurrence. West Newton, Oct. 21, 1872 (*Purdie*, Am. Nat., VII, 1873, 115; first authentic record for the state); Newtonville, 1874 (*Maynard*, Am. Sports., V, 313, Feb. 13, 1875). A specimen (now first recorded) was also taken in Lynn, Nov., 1877, by Mr. N. Vickary.

**73. *Pinicola enucleator* Vieill.** PINE GROSBEAK. Irregular winter visitant, occurring sometimes in abundance, but generally not common.

**\*74. *Carpodacus purpureus* Gray.** PURPLE FINCH. Rather common summer resident; a few probably remain at some localities during winter.

**75. *Loxia leucoptera* Gmel.** WHITE-WINGED CROSSBILL. Irregular winter visitant.

**76. *Loxia curvirostra* var. *americana* Coues.** COMMON CROSSBILL. Irregular winter visitor, but a much more frequent and abundant visitor than the preceding species. A few often occur in summer.

**77. *Ægiothus linaria* Cab.** RED-POLL LINNET. An irregular but often abundant winter visitor.

**78. *Linota flavirostris* var. *brewsteri* Coues.** BREWSTER'S LINNET. Rare or accidental. One specimen taken in Cambridge by Mr. W. Brewster (*Ridgway*, *Am. Nat.*, VI, 433; see also *Baird*, *Brewer and Ridgway*, *Hist. Birds N. Amer.*, I, 1874, 501).

**\*79. *Chrysomitris pinus* Bon.** PINE FINCH. Chiefly spring and autumn migrant; occasionally remains through the winter, and has been known to occur in summer. Marked as breeding by Dr. Emmons.

**\*80. *Chrysomitris tristis* Bon.** YELLOW-BIRD; GOLDFINCH. Common throughout the year, but of gregarious and nomadic habits in winter.

**81. *Plectrophanes nivalis* Meyer.** SNOW BUNTING. Regular and rather common winter visitant.

**82. *Plectrophanes lapponicus* Selby.** LAPLAND LONGSPUR. Winter visitant, mainly near the coast; not common.

**83. *Plectrophanes ornatus* Towns.** CHESTNUT-COLLARED BUNTING. Accidental. (Magnolia, near Gloucester, taken by Mr. C. W. Townsend, July 28, 1876, *Brewer*, *Bull. Nutt. Orn. Club*, II, 1877, 78.)

**84. *Passerculus princeps* Maynard.** IPSWICH SPARROW. Rare winter visitant, occurring chiefly near the coast. Has been met with from Prince Edward's Island and New Hampshire to Long Island.

**\*85. *Passerculus savanna* Bon.** SAVANNA SPARROW. Abundant summer resident along the coast; much less common in the interior.

**\*86. *Poœcetes gramineus* Baird.** GRASS FINCH; BAY-WINGED SPARROW. Abundant summer resident.

**\*87. *Coturniculus passerinus* Bon.** YELLOW-WINGED SPARROW. Common and even abundant summer resident at favorable localities, especially in the Connecticut Valley and near the sea coast.

**\*88. *Coturniculus henslowi* Bon.** HENSLOW'S BUNTING. Rare summer resident.

**\*89. *Ammodromus caudacutus* Swain.** SHARP-TAILED FINCH. More or less common in the salt marshes along the coast, especially in those of Charles River.

**90. *Ammodromus maritimus* Swain.** SEA-SIDE FINCH. Rare or accidental in the salt marshes along the coast. Only one recent record of its capture in the state. (Nahant, Aug., 1877, taken by Mr. G. O. Welch, *Brewer*, Bull. Nutt. Orn. Club, III, Jan., 1878, 48.) Mr. Merriam gives it as a common summer resident in the salt and brackish water marshes of Connecticut (Rev. Bds. Conn., 38).

**91. *Melospiza lincolni* Baird.** LINCOLN'S FINCH. Known only as a rare or casual visitor in spring. Mr. E. I. Shores considers it as not rare at Suffield, Conn., where he believes a few pairs breed (see Merriam's Rev. Bds. Conn., p. 38).

**\*92. *Melospiza palustris* Baird.** SWAMP SPARROW. A not very common summer resident, of rather local distribution.

**\*93. *Melospiza melodia* Baird.** SONG SPARROW. Abundant summer resident; a few sometimes remain in winter in sheltered localities.

**\*94. *Junco hyemalis* ScL.** SNOW BIRD. Mainly a spring and autumn visitant; a few are sometimes observed in winter. Breeds abundantly in the more elevated parts of Berkshire County.

**95. *Junco oregonus* ScL.** OREGON SNOW BIRD. Accidental. (Watertown, March 25, 1874, *Brewster*, Bull. Nutt. Orn. Club, I, 1876, 19.)

**96. *Spizella monticola* Baird.** TREE SPARROW. Common winter visitant.

**\*97. *Spizella socialis* Bon.** CHIPPING SPARROW. Abundant summer resident.

**\*98. *Spizella pusilla* Bon.** FIELD SPARROW. Common summer resident.

**99. *Spizella pallida* var. *breweri* Coues.** CLAY-COLORED SPARROW. Accidental. (Watertown, Dec. 15, 1873, *Brewster*, Am. Nat., VIII, 366.)

**\*100. *Zonotrichia albicollis* Bon.** WHITE-THROATED SPARROW. Abundant spring and autumn migrant. Marked as breeding by Dr. Emmons.

**101. *Zonotrichia leucophrys* Swain.** WHITE-CROWNED SPARROW. Rather rare spring and autumn migrant.

**102. *Chondestes grammaca* Bon.** LARK FINCH. Accidental. Two instances only of its occurrence recorded. (Gloucester, about 1845, *Putnam*, Proc. Essex Inst., I, 1856, 224; Newtonville, Nov. 25, 1877, *Purdie*, Bull. Nutt. Orn. Club, III, Jan., 1878, 44.)

**103. *Passerella iliaca* Swain.** FOX-COLORED SPARROW. Abundant spring and autumn migrant.



**104. *Calamospiza bicolor* Bon.** LARK BUNTING. Accidental. One instance of its capture. (Lynn, Dec. 5, 1877, taken by Mr. N. Vickary. *Allen*, Bull. Nutt. Orn. Club, III, Jan., 1878, 48.)

**\*105. *Euspiza americana* Bon.** BLACK-THROATED BUNTING. Very rare summer resident.

**\*106. *Goniaphea ludoviciana* Bowdich.** ROSE-BREASTED GROS-BEAK. Common summer resident.

**\*107. *Cyanospiza cyanea* Baird.** INDIGO BIRD. Common summer resident.

**108. *Cardinalis virginiana* Bon.** CARDINAL; REDBIRD. Accidental. Very few instances of its occurrence recorded. (Its most northern record is Halifax, N. S., January 31, 1871. *Jones*, Am. Nat., V, 176.)

**\*109. *Pipilo erythrophthalmus* Vieill.** CHEWINK; TOWHEE BUNTING. Abundant summer resident.

**\*110. *Dolichonyx oryzivorus* Swain.** BOBOLINK; "SKUNK BLACKBIRD." Abundant summer resident.

**\*111. *Molothrus ater* Gray.** COWBIRD. Common summer resident.

**\*112. *Agelæus phœniceus* Vieill.** RED-WINGED BLACKBIRD. Common summer resident.

**113. *Xanthocephalus icterocephalus* Baird.** YELLOW-HEADED BLACKBIRD. Accidental. Two instances of its capture, the second here for the first time recorded. First identified from the wings, tail, and foot of a specimen shot by Mr. Frank Sawyer in Watertown, Oct. 15, 1869. (*Allen*, Am. Nat., III, 1870, 636.) Mr. N. Vickary, of Lynn, informs me that two specimens were shot at Eastham, Sept. 10, 1877, by Mr. Loud, of Salem, one of which is preserved.

**\*114. *Sturnella magna* Swain.** MEADOW LARK. Common summer resident; a few sometimes remain in winter.

**\*115. *Icterus spurius* Bon.** ORCHARD ORIOLE. Rare summer resident. More common in the Connecticut Valley than elsewhere in the state.

**\*116. *Icterus baltimore* Daud.** BALTIMORE ORIOLE. Abundant summer resident.

**117. *Scolecophagus ferrugineus* Swain.** RUSTY GRACKLE. Rather common spring and autumn visitant.

**\*118. *Quiscalus purpureus* Licht.** PURPLE GRACKLE. Common summer resident.

**119. *Corvus corax* Linn.** RAVEN. Very rare. Very few recorded instances of its capture within the state. (A recent record is Williamstown [1876?]. *Tenney*, Am. Nat., XI, 243.)

**\*120. *Corvus americanus* Aud.** COMMON CROW. Common resident.

\*121. *Cyanurus cristatus* Swain. BLUE JAY. Common throughout the year.

\*122. *Tyrannus carolinensis* Baird. KINGBIRD. Common summer resident.

123. *Tyrannus dominicensis* Rich. GRAY KINGBIRD. Accidental. Taken in Lynn early in October, 1869. (*Allen*, *Am. Nat.*, III, Feb., 1870, 645.)

\*124. *Myiarchus crinitus* Cab. GREAT CRESTED FLYCATCHER. Rare summer resident.

\*125. *Sayornis fuscus* Baird. PHOEBE; BRIDGE PEWEE. Common summer resident.

\*126. *Contopus borealis* Baird. OLIVE-SIDED PEWEE. Rather uncommon summer resident.

\*127. *Contopus virens* Cab. WOOD PEWEE. Common summer resident.

\*128. *Empidonax minimus* Baird. LEAST PEWEE. Common summer resident.

\*129. *Empidonax trailli* Baird. TRAILL'S FLYCATCHER. Chiefly a spring and autumn visitant; not common. A few remain in summer and breed.

130. *Empidonax flaviventris* Baird. YELLOW-BELLIED PEWEE. Not uncommon in spring and fall.

\*131. *Antrostomus vociferus* Bon. WHIP-POOR-WILL. Common summer resident.

\*132. *Chordeiles virginianus* Bon. NIGHT HAWK. Abundant summer resident.

\*133. *Chaetura pelagica* Steph. CHIMNEY SWIFT. Abundant summer resident.

\*134. *Trochilus colubris* Linn. RUBY-THROATED HUMMING-BIRD. Common summer resident.

\*135. *Ceryle alcyon* Boie. BELTED KINGFISHER. Common summer resident. Occasionally met with in winter.

\*136. *Coccygus erythrophthalmus* Bon. BLACK-BILLED CUCKOO. Common summer resident.

\*137. *Coccygus americanus* Bon. YELLOW-BILLED CUCKOO. Rather frequent summer resident. Somewhat irregularly dispersed, and very variable in respect to numbers in different years.

\*138. *Hylotomus pileatus* Baird. PILEATED WOODPECKER. Nearly or quite extirpated from most parts of the state, but still more or less frequent in Berkshire County, and of occasional occurrence in other well wooded portions of the state.

\*139. *Picus villosus* Linn. HAIRY WOODPECKER. A not common resident. More numerous in winter than in summer, when it is generally rare.

\*140. *Picus pubescens* Linn. DOWNY WOODPECKER. Rather common resident.

141. *Picoides arcticus* Gray. BLACK-BACKED WOODPECKER. Very rare winter visitant. A recent record of its capture in "Middlesex County, fall of 1871." (*Purdie*, Am. Nat., VII, 1873, 693.)

142. *Picoides americanus* Brehm. (*P. hirsutus* of most Massachusetts lists.) BANDED-BACKED WOODPECKER. Very rare or accidental winter visitant. Very few instances are on record of the capture of either species of this genus in the state. *P. arcticus* has been more frequently recorded than *P. americanus*. (See *Allen*, Am. Nat., III, 572.)

\*143. *Sphyrapicus varius* Baird. YELLOW-BELLIED WOODPECKER. Not very uncommon in spring and fall, and a few probably breed, more especially in Berkshire County. (Marked as breeding by Dr. Emons.)

144. *Centurus carolinus* Bon. RED BELLIED WOODPECKER. Accidental. Not to my knowledge yet taken in the state, but observed by me at Springfield, May 13, 1863, under circumstances that would render a mistaken identification almost impossible (*Proc. Essex Inst.*, IV, 53). It has since been taken by Mr. Shores within a few miles of this locality (at Suffield, Conn., *Merriam*, Rev. Birds of Conn., 1877, 65).

\*145. *Melanerpes erythrocephalus* Swain. RED-HEADED WOODPECKER. Rare summer resident, occasionally breeding. Most frequently observed in fall, usually in immature plumage.

146. *Colaptes auratus* Swain. GOLDEN-WINGED WOODPECKER. Abundant summer resident. Occasionally seen in winter.

147. *Strix flammea* Linn. BARN OWL. Very rare or accidental. Only two specimens as yet known to have been taken in the state,—one at Springfield, May, 1868 (*Allen*, *Proc. Essex Inst.*, VI, 1868, 312); the other at Lynn, in 1865 (*Allen*, Am. Nat., III, Feb., 1870, 646).

\*148. *Bubo virginianus* Bon. GREAT HORNED OWL. A not uncommon resident.

\*149. *Scops asio* Bon. MOTTLED OWL. Common, resident.

\*150. *Otus vulgaris* Flem. LONG-EARED OWL. Not common, resident.

\*151. *Brachyotus palustris* Bon. SHORT-EARED OWL. Rather common resident.

152. *Syrnium cinereum* Aud. GREAT GRAY OWL. Accidental or very rare winter visitant. I have no record of its capture in the state since 1866 (Salem, Nov. 10, 1866, *Allen*, Am. Nat., III, Jan., 1870, 570).

\*153. *Syrnium nebulosum* Gray. BARRED OWL. Rather common resident.



\*154. *Nyctale acadica* Bon. SAW-WHET OWL; ACADIAN OWL. Rather common and probably resident. (See *Deane*, Bull. Nutt. Orn. Club, II, 84.)

155. *Nyctale tengmalmi* Bon. (*N. richardsoni* auct.) TENGMALM'S OWL. Rare winter visitor. Recent records of its occurrence are: Lynn, 1863 (*Allen*, Am. Nat., III, Feb., 1870, 646); Cambridge, Dec., 1865 (*Maynard*, Nat. Guide, 1870, 133).

156. *Nyctea scandiaca* Newt. SNOWY OWL. A more or less regular winter visitant. Very abundant during the winter of 1876-77. (See *Deane*, Bull. Nutt. Orn. Club, II, 9, 1877.)

157. *Surnia ulula* Bon. HAWK OWL. Very rare winter visitor in most parts of the state; probably of rather frequent occurrence in the more elevated parts of Berkshire County. (For the record of its occurrence see Am. Nat., III, Dec., 1869, 569.)

158. *Speotyto cunicularia* var. *hypogæa* Coues. BURROWING OWL. Accidental. Newburyport, May 4, 1875 (*Deane*, "Rod and Gun," VI, 97, May 15, 1875).

\*159. *Circus cyaneus* var. *hudsonius* Schl. MARSH HAWK. Common summer resident.

160. *Nauclerus furcatus* Vig. SWALLOW-TAILED HAWK. Accidental. One record of its occurrence (to me a satisfactory one), but none of its capture (Whately, about 1868, *Allen*, Am. Nat., III, Feb., 1870, 645). Mr. Merriam gives it as "a rare straggler from the South," and cites two instances of its occurrence in that state (Rev. Birds Conn., 1877, 76).

\*161. *Accipiter fuscus* Bon. SHARP-SHINNED HAWK. Rather common summer resident.

\*162. *Accipiter cooperi* Bon. COOPER'S HAWK. Common summer resident; of occasional occurrence in winter.

163. *Astur atricapillus* Bon. GOSHAWK. Rather frequent winter visitant. Has been seen in summer, and perhaps occasionally breeds.

164. *Falco gyrfalco* Linn. GYRFALCON. Of rare or accidental occurrence in winter.

164a. *Falco gyrfalco* var. *labradora* Ridg. BLACK GYRFALCON. Accidental. Breed's Island, October, 1876. (*Cory*, Bull. Nutt. Orn. Club, II, Jan., 1877, 27.)

\*165. *Falco communis* Linn. DUCK HAWK. Rare resident; more common in winter than in summer and along the coast than in the interior.

166. *Falco columbarius* Linn. PIGEON HAWK. Rather rare, occurring chiefly in spring, fall, and winter.

\*167. *Falco sparverius* Linn. SPARROW HAWK. More or less common resident; most numerous in spring and fall.

\*168. *Buteo borealis* Vieill. RED-TAILED BUZZARD. A rather common resident.

\*169. *Buteo lineatus* Jard. RED-SHOULDERED BUZZARD. Common resident.

170. *Buteo swainsoni* Bon. SWAINSON'S BUZZARD. Accidental. Two instances of its capture thus far on record. (Salem, winter of 1871-72, Mus. Peabody Academy; Wayland, Sept. 12, 1876, *Brewster*, Bull. Nutt. Orn. Club, III, Jan., 1878, 39 )

\*171. *Buteo pennsylvanicus* Bon. BROAD-WINGED BUZZARD. Rather rare summer resident.

172. *Archibuteo lagopus* Gray. ROUGH-LEGGED BUZZARD. Rather common winter visitant, but of somewhat local distribution.

\*173. *Pandion haliaëtus* Sav. FISH HAWK. Occasional summer visitant. Formerly bred in the state, but probably nests here very rarely, if at all, now.

174. *Aquila chrysaëtus* Linn. GOLDEN EAGLE. Very rare winter visitant. Recent records of its capture are: Munson, Nov., 1864; Deerfield, Dec. 14, 1865; Westfield, three specimens, 1866 (*Allen*, Am. Nat., III, Dec., 1869). I have now to add Fairhaven, Nov. 21, 1873, shot by Mr. Nelson H. Stephens. The specimen was sent in the flesh by Captain Charles Bryant to the Museum of Comparative Zoölogy, where it is now preserved.

\*175. *Haliaëtus leucocephalus* Sav. WHITE-HEADED EAGLE; BALD EAGLE. Rare resident.

176. *Rhinogryphus aura* Ridg. TURKEY VULTURE; "TURKEY BUZZARD." Accidental. Two instances of its capture recorded, but none since 1864.

177. *Catharista atratus* Gray. BLACK VULTURE. Accidental. Quite a number of instances of its capture are on record. Recent ones are Hudson, 1868, where several specimens were seen (*Allen*, Nat., III, Feb., 1870, 646). A recent record also for Maine is Calais, 1869 (*Boardman*, Am. Nat., III, 498).

\*178. *Ectopistes migratorius* Swain. WILD PIGEON. Irregular summer resident, not generally common.

\*179. *Zenædura carolinensis* Bon. CAROLINA DOVE; "MOURNING DOVE." Common summer resident.

180. *Tetrao canadensis* Linn. SPRUCE PARTRIDGE; CANADA GROUSE. Accidental. Only two recorded instances of its capture, which are Gloucester, 1851; Roxbury, about 1865 (*Allen*, Am. Nat., III, Feb., 1870, 636).

\*181. *Cupidonia cupido* Baird. PINNATED GROUSE; PRAIRIE HEN. Formerly common in portions of the state, but long since extirpated from all portions except Martha's Vineyard, where a few are said to still exist.

\*182. *Bonasa umbellus* Steph. RUFFED GROUSE; "PARTRIDGE." Common resident.

\*183. *Ortyx virginianus* Bon. QUAIL; BOB-WHITE. More or less common resident in most parts of the state.

184. *Squatarola helvetica* Cuv. BLACK-BELLIED PLOVER. Generally more or less common during the spring and fall.

185. *Charadrius virginicus* Borek. GOLDEN PLOVER. Common spring and autumn migrant.

\*186. *Ægialites vocifera* Cass. KILLDEER PLOVER. A not common summer resident.

187. *Ægialites semipalmata* Cab. SEMIPALMATED PLOVER; "RING-NECK." Abundant spring and autumn visitant.

\*188. *Ægialites meloda* Cab. PIPING PLOVER; "RING-NECK." Common summer resident along the coast.

189. *Hæmatopus palliatus* Temm. OYSTER-CATCHER. Accidental in summer.

190. *Streptilas interpres* Ill. TURNSTONE. Rather common spring and autumn visitant.

191. *Himantopus nigricollis* Vieill. BLACK-NECKED STILT. Accidental. Mr. Maynard gives it, on the authority of "gunners and others," as "occasionally seen along the sandy beaches" (Nat. Guide, 1870, 143). Mr. Boardman saw, some years since, two specimens in a Boston market, which he was assured were taken in this state (Allen, Am. Nat., III, Feb., 1870, 638).

192. *Steganopus wilsoni* Coues. WILSON'S PHALAROPE. Accidental. No recent record of its capture.

193. *Lobipes hyperboreus* Cuv. NORTHERN PHALAROPE. Known only as a rare spring and autumn migrant.

194. *Phalaropus fulicarius* Bon. RED PHALAROPE. Not common spring and autumn migrant.

\*195. *Philohela minor* Gray. AMERICAN WOODCOCK. Common summer resident.

\*196. *Gallinago wilsoni* Bon. WILSON'S SNIPE. Common during migrations and a rather rare summer resident. A few pass the winter at favorable localities.

197. *Macrorhamphus griseus* Leach. (*M. griseus* et *scolopaceus* auct.) RED-BREASTED SNIPE. Rather common spring and autumn migrant.

198. *Micropalama himantopus* Baird. STILT SANDPIPER. Rare, occurring chiefly during the autumnal migration. Several recent instances of its capture within the state.

199. *Ereunetes pusillus* Cass. SEMIPALMATED SANDPIPER. Abundant during its migrations; a few sometimes met with in summer.



**200. *Tringa minutilla* Vieill.** LEAST SANDPIPER. Abundant during its migrations.

**201. *Tringa bairdi* Coues.** BAIRD'S SANDPIPER. Accidental. Taken by Mr. H. W. Henshaw on Long Island, Boston Harbor, Aug. 27, 1870 (*Brewster*, Am. Nat., VI, May, 1872, 306).

**202. *Tringa fuscicollis* Vieill.** (*T. bonapartei* et *schinzi* auct.) WHITE-RUMPED SANDPIPER. Common spring and fall migrant.

**203. *Tringa maculata* Vieill.** PECTORAL SANDPIPER. Common during its migrations.

**204. *Tringa maritima* Brunn.** PURPLE SANDPIPER. Rather rare spring and autumn visitant; a few sometimes remain in winter.

**205. *Tringa alpina* var. *americana* Cass.** AMERICAN DUNLIN. Abundant spring and autumn visitant; a few sometimes remain in summer.

**206. *Tringa subarquata* Gald.** CURLEW SANDPIPER. Rare or accidental in spring and fall. According to Dr. Brewer, there was no authenticated instance of its occurrence in New England on record prior to 1875, when he announced the capture of a specimen "recently taken" in Ipswich (Proc. Bost. Soc. Nat. Hist., XVII, Nov., 1875, 446). Mr. E. A. Samuels, however, refers to its having been shot on Cape Ann in 1865 (Orn. and Oöl. New Eng., 1868, 447). Mr. Brewster has since recorded its capture in East Boston, early in May, 1866 (Bull. Nutt. Orn. Club, July, 1876, 51).

**207. *Tringa canutus* Linn.** KNOT; RED-BREASTED SANDPIPER. Common spring and autumn visitant.

**208. *Calidris arenaria* Ill.** SANDERLING. Abundant spring and autumn migrant; stragglers sometimes remain in summer.

**209. *Limosa fedoa* Ord.** GREAT MARBLED GODWIT. Rare spring and autumn visitant.

**210. *Limosa hudsonica* Swainson.** HUDSONIAN GODWIT. Rare during its migrations.

**\*211. *Totanus semipalmatus* Gmel.** WILLET. Rare summer resident, sometimes breeding.

**212. *Totanus melanoleucus* Gmel.** GREATER YELLOW-LEGS; GREATER TELLTALE. Common spring and autumn migrant, and a few linger in summer.

**213. *Totanus flavipes* Gmel.** LESSER YELLOW-LEGS. Common spring and autumn visitant; rare in summer.

**214. *Totanus solitarius* Wils.** SOLITARY SANDPIPER. Common in spring and fall; stragglers sometimes remain in summer.

**\*215. *Tringoides macularius* Gray.** SPOTTED SANDPIPER. Common summer resident.

**216. *Philomachus pugnax* Gray.** RUFF. Accidental. The only record of its occurrence appears to be "Newburyport marshes, May 28, 1871" (*Brewster*, Am. Nat., VI, May, 1872, 306).

\*217. *Actiturus bartramius* Bon. UPLAND PLOVER. Common summer resident.

218. *Tryngites rufescens* Cab. BUFF-BREASTED SANDPIPER. Rather uncommon spring and autumn visitant.

219. *Numenius longirostris* Wils. LONG-BILLED CURLEW. A not very common spring and autumn visitant.

220. *Numenius hudsonicus* Lath. HUDSONIAN CURLEW. Rare spring and fall migrant.

221. *Numenius borealis* Lath. ESQUIMAUX CURLEW. Rather common spring and autumn migrant.

222. *Falcinellus igneus* Gray. (*Ibis ordi* auct.) GLOSSY IBIS. Accidental. Several records of its occurrence, but only one recent (Nantucket, Sept., 1869, *Allen*, Am. Nat., III, Feb., 1870, 637).

\*223. *Ardea herodias* Linn. GREAT BLUE HERON. A not common summer resident.

224. *Ardea egretta* Gm. GREAT WHITE EGRET. Accidental. Several comparatively recent instances of its capture have been recorded. (Hudson, Ashland, and Lynn, *Allen*, Am. Nat., III, Feb., 1870, 637; Westford, 1873, *Purdie*, Am. Nat., VII, 693.)

225. *Ardea candidissima* Jacq. LITTLE WHITE EGRET. Accidental. There are fewer recorded instances of the occurrence of this species than the preceding, and none recent.

226. *Ardea cærulea* Linn. LITTLE BLUE HERON. Accidental. No recent record of its occurrence.

\*227. *Ardea virescens* Linn. GREEN HERON. Common summer resident.

\*228. *Nyctiardea grisea* var. *nævia* Allen. NIGHT HERON. Common summer resident. Stragglers have been observed at Cambridge in winter.

229. *Nyctiardea violacea* Swain. YELLOW-CROWNED NIGHT HERON. Accidental. One record (Lynn, Oct., 1862, *Allen*, Am. Nat., III, Feb., 1870, 637).

\*230. *Botaurus minor* Bon. BITTERN. Common summer resident.

\*231. *Ardetta exilis* Gray. LEAST BITTERN. Not generally common, but rather frequent at some localities.

232. *Rallus longirostris* Bodd. CLAPPER RAIL; SALT-WATER MARSH HEN. Accidental. One instance (Boston Harbor, May 4, 1875, *Purdie*, Bull. Nutt. Orn. Club, II, Jan., 1877, 22). Has been repeatedly taken in Connecticut (*Merriam*, Rev. Birds Conn., 1877, 115).

233. *Rallus elegans* Aud. KING RAIL; FRESH-WATER HEN. Accidental. One instance (Nahant, Nov. 21, 1875, *Purdie*, Bull. Nutt. Orn. Club, II, Jan., 1877, 22). A rare summer resident in Southern Connecticut (*Merriam*, Rev. Birds Conn., 115).

\*234. *Rallus virginianus* Linn. VIRGINIA RAIL. Common summer resident.

\*235. *Porzana carolina* Vieill. CAROLINA RAIL; SORA. Common summer resident.

\*236. *Porzana noveboracensis* Cass. YELLOW RAIL. Very rare summer visitant.

237. *Porzana jamaicensis* Cass. BLACK RAIL. Very rare, perhaps accidental, summer visitant. One instance only of its capture in Massachusetts recorded (Clark's Isl., Plymouth Harbor, Aug., 1869, *Purdie*, Bull. Nutt. Orn. Club, II, Jan., 1877, 22). As yet only two records of its capture in Connecticut (see *Merriam*, Rev. Birds Conn., 1877, 119).

\*238. *Gallinula galeata* Bon. FLORIDA GALLINULE. Rare summer visitant, doubtless occasionally breeding (see *Allen*, Am. Nat., III, Feb., 1870, 639). Given by *Merriam* as a "rather common summer resident" of Connecticut (Rev. Birds Conn., 19).

239. *Porphyrio martinica* Temm. PURPLE GALLINULE. Accidental. A recent record of its occurrence is Rockport, Apr. 12, 1875 (*Whitman*, Am. Nat., IX, Oct., 1875, 674). More easterly recent records are Calais, Me., *Boardman*, Am. Nat., III, 498; Halifax, January 30, 1870, *Jones*, Am. Nat., IV, 253).

\*240. *Fulica americana* Gmel. COOT. Rare summer resident; more numerous in fall and spring.

241. *Cygnus americanus* Sharpl. WHISTLING SWAN. Given by Dr. Brewer as "rare, migratory," in Massachusetts (Proc. Bost. Soc. Nat. Hist., XVII, 1875, 447), but I can point to no recent record of its actual capture. In early times (first half of the seventeenth century and later) this species (and probably also the Trumpeter Swan, *C. buccinator*) was common (see Bull. Nutt. Orn. Club, I, Sept., 1876, 58). According to Mr. *Merriam*, swans presumed to be *C. americanus* have recently been taken in Connecticut (Rev. Birds Conn., 1877, 120).

242. *Anser hyperboreus* Pall. SNOW GOOSE. Rare winter visitant.

243. *Anser albifrons* var. *gambeli* Coues. WHITE-FRONTED GOOSE. Rare spring and fall migrant. Some years since I found specimens in the Boston markets I had reason to believe were killed in the state. Dr. Brewer says it was more common thirty and forty years ago than now, as was the case with many of our other ducks and geese (Bull. Nutt. Orn. Club, II, Apr., 1877, 46).

244. *Branta bernicla* Scop. BRANT GOOSE; BLACK BRANT. Not uncommon spring and autumn migrant.

244a. *Branta bernicla* "var. *nigricans*" Coues. With the preceding.

245. *Branta canadensis* Gray. CANADA GOOSE. Common spring and autumn visitant; probably formerly a summer resident.



**245a. *Branta canadensis* "var. *hutchinsi*" Coues.** HUTCHINS' GOOSE. Less common than var. *canadensis*. Formerly more abundant than at present (*Brewer*, Bull. Nutt. Orn. Club, II, Apr., 1877, 46).

**246. *Anas boschas* Linn.** MALLARD. Rare in spring and fall.

**\*247. *Anas obscura* Gmel.** BLACK DUCK. Abundant winter resident and rare in summer; doubtless formerly regularly resident the whole year.

**248. *Dafila acuta* Jenyns.** PIN-TAIL DUCK. Rare winter visitant.

**249. *Chaulelasmus streperus* Gray.** GADWALL; GRAY DUCK. Rather rare spring and autumn visitant.

**250. *Mareca americana* Steph.** BALDPATE; AMERICAN WIDGEON. Spring and autumn visitant.

**251. *Querquedula discors* Steph.** BLUE-WINGED TEAL. Rather common spring and autumn migrant; formerly doubtless a summer resident.

**252. *Querquedula carolinensis* Steph.** GREEN-WINGED TEAL. Common spring and autumn migrant.

**253. *Spatula clypeata* Boie.** SHOVELLER. Rare spring and autumn visitant. It was formerly, judging from its present breeding range in the interior, a frequent summer resident.

**\*254. *Aix sponsa* Boie.** WOOD DUCK; SUMMER DUCK. Common summer resident.

**255. *Fuligula marila* Steph.** GREATER BLACKHEAD; SCAUP DUCK. Not common spring and autumn visitant, some remaining in winter.

**255a. *Fuligula marila* var. *affinis* Allen.** LESSER BLACKHEAD. Not common in spring and fall.

**256. *Fuligula collaris* Bon.** RING-NECKED DUCK. Rare spring and autumn migrant.

**257. *Fuligula ferina* var. *americana* Coues.** REDHEAD; POCHARD. Rare spring and autumn migrant. •

**258. *Fuligula vallisneria* Steph.** CANVASS-BACK. Very rare spring and autumn visitant.

**259. *Bucephala clangula* Gray.** GOLDEN-EYED DUCK; WHISTLER. Common winter resident.

**260. *Bucephala islandica* Baird.** BARROW'S GOLDEN-EYE. Rare winter visitant. Only recently added to the fauna of the state on record of its actual capture (*Brewster*, Am. Nat., VI, May, 1872, 306).

**261. *Bucephala albeola* Baird.** BUFFLE-HEAD; BUTTER-BALL. Common winter visitant.

**262. *Harelda glacialis* Leach.** LONG-TAILED DUCK; OLD WIFE; OLD SQUAW. Common winter visitant.

**263. *Histrionicus torquatus* Bon.** HARLEQUIN DUCK. Rare

winter visitant. Formerly, like most of the ducks; more common than now (*Brewer*, Bull. Nutt. Orn. Club, II, Apr., 1877, 46).

264. *Camptolæmus labradorius* Gray. LABRADOR DUCK. Formerly a rare winter visitant; probably now nearly extinct.

265. *Somateria mollissima* Leach. EIDER DUCK. Common spring and autumn visitant, some remaining in winter.

266. *Somateria spectabilis* Leach. KING EIDER. Rare winter visitant.

267. *Ædemia americana* Swain. SCOTER. Abundant in spring and fall and common in winter.

268. *Ædemia fusca* Swain. VELVET SCOTER; WHITE-WINGED COOT. Common winter visitant.

269. *Ædemia perspicillata* Fleming. SURF DUCK. Common winter visitant.

270. *Erismatura rubida* Bon. RUDDY DUCK. Rather common winter visitant, but most numerous in fall and spring.

271. *Mergus merganser* Linn. GOOSANDER; MERGANSER. Common winter visitant, but most numerous in fall and spring.

272. *Mergus serrator* Linn. RED-BREASTED MERGANSER. Abundant in spring and fall, many remaining in winter.

273. *Mergus cucullatus* Linn. HOODED MERGANSER. Rather common spring and autumn visitant, many remaining in winter, and perhaps in summer.

274. *Sula bassana* Linn. GANNET; SOLAN GOOSE. Common winter visitant.

275. *Pelecanus trachyrhynchus* Lath. WHITE PELICAN. Now accidental; formerly common (*Allen*, Bull. Nutt. Orn. Club, I, Sept., 1876, 60). The only recent correct record of its capture appears to be North Scituate, Oct. 6, 1876 (*Purdie*, Bull. Nutt. Orn. Club, II, Jan., 1877, 22). The specimens reported by me (*Am. Nat.*, III, Feb., 1870, 640) as taken at Ipswich and Nantucket were found later to be *P. fuscus*. (See remarks under *P. fuscus*.)

276. *Pelecanus fuscus* Linn. BROWN PELICAN. Accidental. Ipswich (*Maynard*, Nat. Guide, 1870, 149; erroneously noticed by me under the head of the preceding species in *Am. Nat.*, III, 640). Nantucket (*Allen*, *Am. Nat.*, III, Feb., 1870, 640, but wrongly given as *P. erythrorhynchus*). Corrected in a note added to last page of author's extras, in which it is stated that "from information just received there is every reason for believing that this flock" of White Pelicans, mentioned on page 40 (of extras) as having visited Nantucket Island, "were Brown Pelicans."

277. *Graculus carbo* Gray. COMMON CORMORANT. Common winter resident.

278. *Graculus dilophus* Gray. DOUBLE-CRESTED CORMORANT. Not uncommon in winter.

**279. *Stercorarius pomatorhinus* Vieill.** POMARINE JAEGER; POMARINE SKUA. A not common winter visitant.

**280. *Stercorarius parasiticus* Coues.** (*S. crepidatus* Saund.) RICHARDSON'S SKUA; PARASITIC JAEGER. Along the coast in winter; not common.

**281. *Stercorarius buffoni* Coues.** (*S. parasiticus* Saund.) BUFFON'S SKUA. Rare on the coast in winter.

**282. *Larus glaucus* Brünn.** GLAUCOUS GULL. Rare winter visitant.

**283. *Larus leucopterus* Fabr.** WHITE-WINGED GULL. Rare winter visitant.

**284. *Larus marinus* Linn.** GREAT BLACK-BACKED GULL. Common winter visitant.

**285. *Larus argentatus* Linn.** HERRING GULL. Abundant winter visitant; a few remain along the coast in summer, where formerly they probably bred.

**286. *Larus delawarensis* Ord.** RING-BILLED GULL. Rather uncommon on the coast in winter.

**287. *Larus tridactylus* Linn.** KITTIWAKE GULL. Common winter visitant.

**\*288. *Larus atricilla* Linn.** LAUGHING GULL. Formerly a not uncommon summer visitant; now nearly extirpated from our coast.

**289. *Larus philadelphia* Ord.** BONAPARTE'S GULL. Common winter visitant, but more numerous in fall and spring.

**290. *Xema sabinei* Bon.** FORKED-TAILED GULL. Accidental. The only record is Boston Harbor, Sept. 27, 1874 (*Brewster*, Am. Sportsman, V, 1875, 370).

**291. *Sterna anglica* Mont.** (*S. aranea* auct.) GULL-BILLED TERN. Accidental. A recent record is Ipswich, Sept., 1871 (*Brewster*, Am. Nat., VI, May, 1872, 306).

**292. *Sterna caspia* Pallas.** CASPIAN TERN. Rare or accidental in winter.

**293. *Sterna regia* Gamb.** ROYAL TERN. Accidental. Two specimens taken by Messrs. Maynard and Brewster on Nantucket Island, July 1, 1874 (Am. Sports., V, 249, Jan. 16, 1875).

**294. *Sterna cantiaeca* Gmel.** (*S. aculeiflavora* auct.) SANDWICH TERN. Accidental. One record only, Chatham, August, 1865 (*Allen*, Amer. Nat., III, Feb., 1870, 644).

**\*295. *Sterna hirundo* Linn.** COMMON TERN. Abundant summer resident along the coast.

**296. *Sterna forsteri* Nutt.** (*S. havelli* auct.) FORSTER'S TERN. Rare or accidental. Ipswich, Sept., 1870 (*Brewster*, Am. Nat., VI, May, 1872, 306; coast, "two or three" specimens, 1873, *Purdie*, Am. Nat., VII, 693).



**\*297. *Sterna macrura* Nord.** ARCTIC TERN. Abundant summer resident along the coast.

The form described as *Sterna portlandica* by Mr. Ridgway (Amer. Nat., VIII, 1874, 433), and since referred to *S. macrura* by Brewster (Ann. Lyc. Nat. Hist. N. Y., XI, 1875, 201) and Saunders (Proc. Zool. Soc., Lond., 1876, 650) has been taken on Muskeget Island (Brewster, Am. Sports., V, 249, Jan. 16, 1875).

**\*298. *Sterna dougalli* Mont.** (*S. paradisea* auct.) ROSEATE TERN. Common along the coast in summer.

**\*299. *Sterna supercilialis* var. *antillarum* Coues.** LEAST TERN. Common along the coast in summer.

**300. *Sterna fuliginosa* Gmel.** SOOTY TERN. Accidental. Two recent records of its capture in Massachusetts,—Lawrence, Oct. 29, 1876 (*Deane*, Bull. Nutt. Orn. Club, II, Jan., 1877, 27); Williamstown, Sept., 1876 (*Tenney*, Am. Nat., XI, 1877, 243). Also several times taken recently in Connecticut and Rhode Island,—Saybrook, Conn., summer of 1876 (*Purdie*, Bull. Nutt. Orn. Club, II, Jan., 1877, 22; see also *Merriam*, Rev. Birds Conn., 1877, 134). From these records it appears that six specimens were taken in Connecticut, one in Rhode Island, and two in Massachusetts, during 1876, mostly in September.

**301. *Hydrochelidon lariformis* Coues.** SHORT-TAILED TERN; BLACK TERN. Accidental, or very rare. Ipswich, taken by Mr. C. J. Maynard (*Allen*, Am. Nat., III, Feb., 1870, 644).

**302. *Cymochorea leucorrhoa* Coues.** LEACH'S PETREL. Common winter visitant along the coast.

**303. *Oceanites oceanica* Coues.** WILSON'S PETREL. Common off the coast.

**304. *Puffinus major* Fabr.** GREATER SHEARWATER. Common off the coast, especially in winter.

**305. *Puffinus fuliginosus* Strick.** SOOTY SHEARWATER. More or less common off the coast, especially in winter.

**\*306. *Colymbus torquatus* Brünn.** LOON; GREAT NORTHERN DIVER. More or less frequent resident.

**307. *Colymbus septentrionalis* Linn.** RED-THROATED DIVER. Common winter visitant along the coast; rare in the interior; most numerous in autumn and spring.

**308. *Podiceps cornutus* Gmel.** HORNED GREBE. Chiefly a winter visitant, but not common; a few remain in summer.

**309. *Podiceps griseigena* var. *holbolli* Coues.** RED-NECKED GREBE. Chiefly a winter visitant; not common. Sometimes met with in summer.

**\*310. *Podilymbus podiceps* Lawr.** PIED-BILLED GREBE. Rather rare resident; more common in spring and fall than at other seasons.

**311. *Utamania torda* Leach.** RAZOR-BILLED AUK. Not uncommon winter visitant along the coast.

**312. *Fratercula arctica* Steph.** ARCTIC PUFFIN; SEA PARROT. Not uncommon winter visitant.

**313. *Mergulus alle* Vieill.** DOVEKIE; SEA DOVE. Irregular and generally rare winter visitant along the coast; occasionally common.

**314. *Uria grylle* Brünn.** BLACK GUILLEMOT. Rather common winter visitant.

**315. *Lomvia troile* Brandt.** (*L. troile et ringvia* auct.) COMMON GUILLEMOT; MURRE. Common winter visitant.

**316. *Lomvia arra* Coues.** (*Cataractes lomvia* Bryant.) THICK-BILLED GUILLEMOT. Common winter visitant along the coast.

## 2. Extirpated Species.

**1. *Meleagris gallopavo* var. *occidentalis* Allen.** WILD TURKEY. Well known to have been a common species in southern New England for a long time subsequent to the first settlement of this part of the country (see Bull. Nutt. Orn. Club, I, Sept., 1876, 55), but long since ceased to exist here in a wild state. Considered as nearly extinct by Emmons in 1833, but said by Hitchcock to be at that time "frequently met with on Mount Holyoke" (Rep. on Geol. Mass., etc., 1833, 549).

**2. *Grus canadensis* Temm.** SANDHILL CRANE; BROWN CRANE. Unquestionably more or less abundant two hundred years ago (see Bull. Nutt. Orn. Club, I, Sept., 1876, 58), but there is no recent record of its occurrence.

**3. *Grus americanus* Ord.** WHOOPING CRANE; WHITE CRANE. This species was given by Emmons in 1833 as a rare but regular visitant, but there is no later record of its occurrence. It unquestionably occurred here at the time of the first settlement of the country, in common with the preceding species.

**4. *Alca impennis* Linn.** GREAT AUK. The former existence of this species in Massachusetts is attested by the occurrence of its bones in the Indian shell heaps of the coast, particularly at Ipswich, and there are also unquestionable allusions to its presence on Cape Cod at the time the coast was explored by Gosnold in 1602 (see Bull. Nutt. Orn. Club, I, Sept., 1876, 59).

Other species that are virtually extirpated, although retained in the preceding list, are the Prairie Hen (*Cupidonia cupido*), supposed to be now restricted to Martha's Vineyard, where only a few, if indeed any, representatives of this formerly rather common species still exist (see *antea*, p. 22); the Whistling Swan (*Cygnus americanus*), now only a rare straggler, and probably also the Trumpeter Swan (*Cygnus buccinator*). To these may probably be added the Labrador or Pied Duck (*Camptolæmus labradorius*), respecting which see Rowley, Orn. Miscel., pt. VI, pp. 205-223, 1877; also Bull. Nutt. Orn. Club, III, Apr., 1878.

### 3. *Species of probable occurrence.*

Of the following list of twenty-four species, the greater part have been included in various former lists of the birds of Massachusetts, but generally on inferential or hearsay evidence, or by erroneous identifications. Six have actually been taken within the last three or four years by Mr. E. I. Shores, within a few miles of the southern boundary of the state (near my old collecting ground at Springfield). Others, from their known general range, must evidently occur at rare intervals, and I confidently expect that within the next ten years at least seven-eighths, and probably nine-tenths, of them will be added to the list of those included from having been actually taken within the state. At least one-half of them have already been obtained in adjoining states at points not far from the Massachusetts line.

1. *Saxicola œnantha* *Bech.* STONECHAT. Has been taken in Labrador, at Quebec, Canada, and on Long Island, and is of frequent occurrence in the Bermudas.

2. *Lophophanes bicolor* *Bon.* CRESTED TITMOUSE. Northern New Jersey; Long Island; New London, Conn. (one instance, *Merriam*, *Rev. Birds Conn.*, 1877, 9); New Haven, Conn. (*Linsley*); New Hampshire.

3. *Protonotaria citrea* *Baird.* PROTHONOTARY WARBLER. Of accidental occurrence in eastern Maine and New Brunswick (*Brewer*, *Proc. Bost. Soc. Nat. Hist.*, XVII, 439, on the authority of Mr. Boardman), and being a southern species may be looked for as of casual occurrence in Massachusetts.

4. *Helminthus vermivorus* *Bon.* WORM-EATING WARBLER. Has been taken in Suffield, Conn., on the southern boundary of Massachusetts, and is a rather common summer resident in portions of Southern Connecticut (*Purdie*, *Bull. Nutt. Orn. Club*, II, Jan., 1877, 21; *Am. Nat.*, VII, 1873, 692).

5. *Helminthophaga pinus* *Baird.* BLUE-WINGED YELLOW WARBLER. "A summer resident in southern Connecticut and in the Connecticut Valley," where it breeds (*Merriam*, *Rev. Birds Conn.*, 14).

6. *Dendroica cœrulea* *Baird.* CÆRULEAN WARBLER. Has been taken as far north as Suffield, Conn., on the southern boundary of the state (*Purdie*, *Bull. Nutt. Orn. Club*, II, 1877, 22).

7. *Oporornis formosa* *Baird.* KENTUCKY WARBLER. Was taken by Mr. E. I. Shores in Suffield, Conn., Aug. 16, 1876,—the only record for New England (*Merriam*, *Rev. Birds Conn.*, 1877, 22).

8. *Myiodioides mitrata* *Aud.* HOODED WARBLER. Rare summer resident in southern Connecticut (*Merriam*). Has been taken in Suffield, Conn., by Mr. E. I. Shores, July 8, 1875 (*Purdie*, *Bull. Nutt. Orn. Club*, II, 1877, 21).



**9. *Stelgidopteryx serripennis* Baird.** ROUGH-WINGED SWALLOW. Taken at Suffield, Conn., by Mr. E. I. Shores, June 6, 1874 (*Purdie*, Bull. Nutt. Orn. Club, II, Jan., 1877, 21), its only New England record. It has been found, however, breeding at West Point, New York (*Mearns*, Bull. Nutt. Orn. Club, III, Apr., 1878, —), and will doubtless soon be added to the fauna of Massachusetts.

**10. *Goniaphea cærulea* Gray.** BLUE GROSBEAK. This southern species having been taken at Grand Menan and Calais, Maine (*Boardman*, Proc. Bost. Soc. Nat. Hist., IX, 1862, 127) is surely to be added, sooner or later, to the list of Massachusetts birds. Its occurrence is *a priori* far more probable than that of many species that have been found here.

**11. *Perisoreus canadensis* Bon.** CANADA JAY. This species occurs doubtless in Berkshire County as an occasional winter visitor.

**12. *Tyrannus verticalis* Say.** ARKANSAS FLYCATCHER. This species has been taken at Elliot, Maine (*Bryant*, Proc. Bost. Soc. Nat. Hist., X, 1865, 96; *Purdie*, Bull. Nutt. Orn. Club, I, Sept., 1876, 73), and is as likely to occur in this state as many western and southern species that have already been taken here.

**13. *Corvus ossifragus* Wils.** FISH CROW. Probably rare or accidental. Although there is as yet no record of its capture within the state, Mr. W. Brewster, who is familiar with the species, observed a single individual in Cambridge, March 16, 1875 (*Brewster*, Bull. Nutt. Orn. Club, I, 19). Its recent capture at West Point, N. Y., and on Long Island, tends to confirm its reported occurrence in Connecticut by Linsley (*Am. Jour. Sci. and Arts*, XLIV, 1843, 260) and render it almost certain that stragglers will soon be taken here. It is so easily confounded with the Common Crow, even when in hand, by ordinary observers, that it may for this reason have been heretofore overlooked.

**14. *Empidonax acadicus* Baird.** ACADIAN FLYCATCHER. Not known to have been taken in the state, but it has been obtained by Mr. E. I. Shores in Suffield, Conn., within ten miles of my old collecting ground at Springfield, Mr. Shores's specimen having been identified as *E. acadicus* by no less an authority than Mr. Robert Ridgway (*Merriam*, Rev. Birds Conn., 1877, 58). This places the species beyond question in the list of New England birds (see *Brewer*, Proc. Bost. Soc. Nat. Hist., XVII, 1875, 452). I recorded this bird in 1864 as occurring at Springfield (*Proc. Essex Inst.*, IV, 54), but have since become convinced that I mistook for it *E. traillii*.

**15. *Ægialites wilsonia* Cass.** WILSON'S PLOVER. Its reported occurrence in the state rest on not wholly satisfactory authority (see *Brewer*, Proc. Bost. Soc. Nat. Hist., XVII, 1875, 452). There appears to be no recent well-authenticated instance of its occurrence north of Long Island.

**16. *Scolopax rusticola* Linn.** EUROPEAN WOODCOCK. The occasional capture of this European species on the Atlantic coast, from Maine to Virginia (Loudon County, Nov., 1873, *Coues*, *Am. Nat.*, X, 372), seems to render it probable that it will eventually be taken in this state.

**17. *Recurvirostra americana* Gmel.** AVOSSET. As this species has been taken in one instance at Point Lepreaux, New Brunswick (not Calais, Me., as generally supposed; see *Brewer*, *Proc. Bost. Soc. Nat. Hist.*, XVII, 1875, 452), and near Saybrook, Conn. (*Merriam*, *Rev. Birds Conn.*, 1877, 103), it may be fairly looked for as an accidental visitor.

**18. *Cygnus buccinator* Rich.** TRUMPETER SWAN. Recently reported by Mr. Merriam (*Rev. Birds Conn.*, 1870, 120) as probably occurring in the vicinity of East Windsor Hill, Conn. (within fifteen miles of the Massachusetts line). In all probability it was common here two hundred years ago and may still be looked for as a straggler.

**19. *Anser cærulescens* Pallas.** BLUE GOOSE. May be an accidental visitor, but according to Dr. Brewer (*Proc. Bost. Soc. Nat. Hist.*, XVII, 1875, 452) there is no record of its actual occurrence in New England.

**20. *Branta leucopsis* Boie.** BARNACLE GOOSE. As this accidental visitor has been taken in southern Labrador, Maine, on Long Island, and in North Carolina, and more than the "eight escaped birds" have been accounted for, it seems reasonable to include this species among those of probable occurrence in Massachusetts. On the occurrence of this species on the Atlantic coast of North America see Baird (*Am. Nat.*, II, March, 1868, 39), Brewer (*Proc. Bost. Soc. Nat. Hist.*, XVII, 1875, 452), Lawrence (*Am. Nat.*, V, March, 1870, 10), and Lawrence and Deane (*Bull. Nutt. Orn. Club*, II, Jan., 1877, 18). I understand specimens have recently been taken near Portland, Maine. It has been repeatedly attributed to Massachusetts, but probably on insufficient evidence. (See *Allen*, *Proc. Essex Inst.*, IV, 1864, 88; *Coues*, *Proc. Essex Inst.*, VI, 1868, 298.)

**21. *Mareca penelope* Bon.** EUROPEAN WIDGEON. This species likewise lacks confirmation as a bird of Massachusetts, or even of New England, although it has been taken on Long Island, and at various points in North America. It is of course to be looked for here.

**22. *Querquedula crecca* Steph.** EUROPEAN TEAL. The specimens recorded by Dr. Bryant (*Proc. Bost. Soc. Nat. Hist.*, V, 1855, 195) as taken in this state Dr. Brewer says was actually taken in North Carolina and not in Massachusetts (*Bull. Nutt. Orn. Club*, II, Apr., 1877, 46). This leaves the species without even a New England record, but it has so often been taken on the North American coast (at various points from Labrador to North Carolina) as a straggler from the Old World, that its occurrence here is to be expected.

**23. *Procellaria pelagica* Linn.** STORMY PETREL. Usually given as occurring off the coast, but Dr. Brewer doubts its right to a place among New England birds, since he has not been able to learn that a specimen has been taken (Proc. Bost. Soc. Nat. Hist., XVII, 1877, 453).

**24. *Puffinus anglorum* Temm.** MANK'S SHEARWATER. Commonly given as more or less frequent off the coast in winter, but Dr. Brewer (Proc. Bost. Soc. Nat. Hist., XVII, 1875, 453) claims that it has never been taken, and that it is not even a North American bird.

The Crested Grebe (*Podiceps cristatus*) has been commonly given as a rare winter visitant. Dr. Brewer says it has been improperly included as a bird of New England and that "its right to be regarded even as North American is also 'questioned'" (Proc. Bost. Soc. Nat. Hist., XVII, 1875, 453). He has since shown that all the references to its capture in North America (Bull. Nutt. Orn. Club, III, Apr., 1878, 52) are erroneous, as is now very generally conceded.

#### 4. *Hypothetical and doubtful Species.*

**1. *Myiodiocetes minutus* Baird.** SMALL-HEADED FLYCATCHER. Dr. Brewer retains this species as a bird of Massachusetts on the ground that Nuttall "states that Mr. Charles Pickering obtained a specimen of this bird many years ago, near Salem, Mass., and that he [Nuttall] had himself also seen it in the same State, at the approach of winter." Dr. Brewer further refers to a specimen "supposed to be of this species," and so identified by Mr. Audubon, that he once obtained in Roxbury, but admits that, as Audubon afterwards made no mention of it, the presumption is that he was mistaken as to the identity of the specimen. No specimen of this supposed species is extant, and it is only known from the descriptions and figures given long since by Wilson and Audubon. According to the latter the original locality was Kentucky. I agree with Dr. Coues that the species is one hardly entitled to recognition, and I prefer to discard it, for the present, as a bird of Massachusetts. (See Baird, Brewer and Ridgway's Hist. North Am. Birds, I, 1874, 316.)

**2. *Empidonax pygmæus* Minot.\*** "PYGMY FLYCATCHER." Only "caught sight of" "in some shrubbery" "near Boston" by our young author, who "watched it for about three minutes," and then proceeded to describe it as a *new species*! No characters are given, by which it can be distinguished from any of the species of *Empidonax*, and those are half conjectural. The presumption of adding a "new species" on

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\* Land Birds and Game Birds of New England, 1877, 290.



such a basis, in a group of birds so difficult of discrimination as to often puzzle experts with the specimens actually in hand, is certainly open to censure.

3. *Thaumatias linnæi* Bon. (*Agyrtia maculata et linnæi* auct.) LINNÆUS'S EMERALD. Supposed to have been taken in Massachusetts, and included in several lists. The probabilities seem to me to be strongly against the straggling of any South American Humming Bird to this state, and the history of this specimen leaves room for doubt respecting its actual capture here. It was first recorded by myself (Am. Nat., III, Feb., 1870, 645); but with much hesitation. The circumstances of its supposed capture here have since been more fully investigated, and I now prefer not to recognize it as entitled to a record as a bird of Massachusetts.

5. *Introduced undomesticated Species, or probably introduced either intentionally or accidentally.*

1. *Passer domesticus* Linn. HOUSE SPARROW. Abundant near the larger towns and rapidly increasing, although the first importation was made scarcely ten years ago.

2. *Carduelis elegans* Steph. EUROPEAN GOLDFINCH. Repeatedly taken or observed in a wild state, under circumstances that seem to render it probable that the individuals were *not* escaped cage-birds. Whether or not introduced originally by man's agency I consider seriously open to question.

3. *Serinus meridionalis* Brehm. SERIN FINCH. Thus far only one record is known to me of its capture,—Springfield, Nov., about 1865 (Allen, Am. Nat., III, Jan., 1870, 635). Perhaps an escaped cage-bird, but the probabilities seem to me to be against this theory.

4. *Coturnix communis* Gray. EUROPEAN QUAIL. About one hundred of these birds were imported by Mr. Warren Hapgood in the spring of 1877, and distributed to various parts of the State. Only a few pairs are known to have raised young, and the result of the experiment is at present doubtful. The capture of a "young-cock bird" at Essex, Nov. 1, 1877, is recorded in "Forest and Stream" of Dec. 6, 1877 (p. 345). This importation consisted of two hundred and fifty birds, sixty-one of which died on the passage, leaving one hundred and eighty-nine for distribution on their arrival in Massachusetts about June 10. The same vessel brought a consignment of two hundred birds of this species to Judge Martin G. Evarts of Rutland, Vt., all but three of which are said to have reached Rutland alive. They were turned out June 9, and 11, 1877, and are reported to have bred plentifully. They disappeared from the neighborhood of Rutland about September 1, and have since been reported as seen (aside from

"bogus" reports of their flying out to sea) at various localities in the Southern States, the last authentic account up to the present writing representing several bevvies as seen near Savannah, Ga., as late as December 10. (For a history of the introduction and migration of this species see "Forest and Stream" of issues of June 28, Aug. 2, Aug. 9, Aug. 23, Sept. 6, Nov. 15, Nov. 29, Dec. 6, and Dec. 27, 1877.)

**5. *Lagopus albus* Aud.** WILLOW PTARMIGAN. The specimen taken in Manchester, in May, 1859, Dr. Coues conjectures was brought alive from Labrador or Newfoundland, and escaped (Proc. Essex Inst., V. 1868, 259).

**6. *Cupidonia cupido* Baird.** PINNATED GROUSE. A few have been introduced at different times into Barnstable County, but none of them or their descendants are certainly known to still exist there.

Dr. Brewer informs me that several European Black-cap Warblers (*Sylvia atricapilla*) were at one time turned loose in Mount Auburn Cemetery, but are known to have all soon after died.

#### GENERAL SUMMARY.

Fully authenticated as birds of the State <sup>10</sup> . . . . .	316
Extirpated . . . . .	4
Given as of probable occurrence . . . . .	24
Considered as fairly entitled to recognition as Massachusetts birds	340
Known as breeding within the State (about) . . . . .	135
Extremely rare or accidental visitors . . . . .	90
Introduced . . . . .	6
North American species added since 1867. . . . .	35

#### ADDENDUM.

**57bis. *Pyranga ludoviciana* Bon.** LOUISIANA TANAGER. Since this paper went to press a specimen of this western species has been taken alive in Salem, and its occurrence recorded by Dr. Brewer ("Forest and Stream," X, 95, March 14, 1878). It was captured Jan. 20, 1878, during the severest snow storm of the season, and being, in winter, a bird of Mexico, is presumed to have been involuntarily carried northward by the storm. It was an "adult female, and, though ravenous for food, was not in wasted condition."

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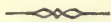
<sup>10</sup> Excluding "varieties" of other species represented.

MONDAY, JANUARY 21, 1878.

MEETING this evening at 7.30 o'clock. The PRESIDENT in the chair.

Miss Mary Saunders, of Salem, was elected a resident member.

Prof. E. S. MORSE gave an interesting lecture upon Japan. It was a familiar talk on topics suggested by his recent sojourn in that country, with an especial reference to the artistic ways of the people, the manner in which they utilized the most common objects, like bamboo and pine, in their ornamental work; and the wonderful taste exhibited by the commonest venders in the display of their wares. Samples of their work in straw, fungus, and other material, were shown. He spoke also of the richer works in bronze, and the art feeling displayed in the most unexpected ways by combining the most exquisitely wrought work in pearl, ivory, and silver, in combination with worm-eaten wood as a background. Their gardens, paths, gateways and fence posts, and interior of dwellings were also illustrated.



MONDAY, FEBRUARY 4, 1878.

MEETING this evening at 7.30 o'clock. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

The subject of commemorating the 250th anniversary of the landing of Governor Endicott at Salem was introduced. Remarks in relation thereto were made, and on



motion of Mr. W. D. Northend, Vice-President A. C. Goodell was added to the committee previously appointed.

REV. GEORGE D. WILDES, of New York, who, during his rectorship of Grace Church in this city, was an active member of the Institute, being present, by invitation from the chair made some interesting remarks, informally expressing his pleasure at being present, once more, at one of these meetings, after an absence of eleven years; his interest in the proposed celebration, and giving an account of a recent visit to York Harbor, Maine, of which he mentioned some facts pertaining to its history. He brought to the meeting the military journal of Gen. Abbott of 1779, reading some extracts from the same. It is now owned by Mr. Frank Chase of Salem. Mr. Wildes also alluded to his present place of residence, which is replete with historic lore, noting especially some of the places around which cluster many of the most important incidents of the revolutionary period.

HON. WILLIAM D. NORTHEEND mentioned several incidents in the lives of some of the distinguished men who have originated in the town of Newbury, which were suggested by the remarks of the previous speaker.

On motion of Mr. W. P. Upham :

*Voted*, That the sincere thanks of the Institute be tendered to Rev. Mr. Wildes for his interesting remarks this evening.

MONDAY, FEB. 25, 1878.

Mr. LEONARD WALDO, of the Cambridge Observatory, gave an instructive illustrated lecture on

*Telling the Time.*

The occasion of our gathering here this evening is, I believe, a unique one in the annals of New England; but if the kind words which Charles Kingsley has spoken of the people of Salem are true, and if that strong interest in all that pertains to seamen and ships is still alive, I feel that our evening will be spent profitably and pleasantly together.

The time-balls dropped from their masts at Deal, at Cape Town, and from the magnificent heads of Sydney harbor, are perhaps familiar to more than one member of the time-honored East India Marine Society who may be with us this evening; and it will be to him not an uninteresting thought, that in those distant British colonies there exists this thoughtful attention to the needs of every ship, domestic or foreign, which enters their ports.

He will reflect, doubtless, that until within a few weeks this kindness has not been reciprocated in one American seaport. And he will be gratified to know that the Western Union Telegraph Company now display at five minutes of twelve, a ball at the top of a mast placed on the highest pinnacle of their Broadway building in New York; and that precisely noon, as indicated from the U. S. Naval Observatory, Washington, it falls from its conspicuous position. Hearing this, your natural New England pride suggests the query of the Cambridge poet,

"Wall, neighbor, tell us wut's turned up thet's new?  
You're younger'n I be,—nigher Boston tu:  
An' down to Boston, ef you take *their* showin',  
Wut they don't know ain't hardly wuth the knowin',  
There's sunthin' goin' on, I know."

I think I may assure you that not many weeks will elapse until Boston will offer this same advantage to the ships within her harbor.

I have mentioned the time-ball first, because it has secured for itself a wide recognition as the simplest way of announcing an arbitrary instant of time. But like the newspaper dropped at the door, or the water which flows upon turning the faucet, the simple result attained in the dropping of a time-ball is the out-growth of the most refined principles of mechanism, and is the product of skilful assiduity on the part of the astronomer. It is our province now to ask these questions, "Where do we get and how do we keep our time?" These questions come with force at the moments when we stand looking alternately at the face of our watch, and the rear platform of a departing train; or when the Gold Stock Exchange closes one minute before we thought it would; or when some majestic steamer wrecks in a fog on our coast because her chronometers are at fault.

We all know that whatever may be the merits of our sun in other respects he is not a very accurate marker of the length of a day. Thus February 10th, he is fifteen minutes slow of any respectable clock, and then he catches up until the middle of May, when he is four minutes fast. July 25th, again, he is six minutes slow, and November 2nd, he crosses the meridian sixteen minutes before twelve. From time immemorial, however, the sun has marked the beginning of the day's labor, and in order to overcome the difficulties in measuring the length of a day, caused by the sun's irregularity, astronomers imagine that there exists in the heavens a fictitious sun, which moves uniformly along the Equator of the heavens. Four times in the course of a year the fictitious sun and the real sun indicate the same clock time. I shall point out to you



later some difficulties in the way of exactly determining our time from the sun. But while he is seldom used in the Observatory for such a purpose, an exact knowledge of his motion, and some exact way of measuring his position, is of the utmost importance to the navigators; and I suppose it is to them we owe the wide-spread opinion that from observations of the sun, all astronomers determine the time.

Brilliant even through a haze, easily observed even when the ship's deck is rolling, the navigator readily brings the reflected sun and the horizon in contact with the telescope of his sextant. From his tables, with an approximate knowledge of his latitude, he will tell you at just what time the sun will reach a certain altitude, and this will afford him a means of detecting the error of his chronometer on local time.

But we are chiefly to concern ourselves to-night with the instruments used in fixed observatories for determining time. You are aware that the stars are located on the celestial sphere by a system of coördinates, closely resembling our terrestrial ones of latitude and longitude; only when applied to the heavens these terms are changed to the more technical ones of Declination and Right Ascension. Now Declinations the astronomer measures with carefully graduated circles, but in measuring Right Ascensions the astronomer fixes his instrument in one plane, and notes by his clock, how long after one star passes this plane, another follows it. But he must be able to measure this interval of time with a degree of accuracy which corresponds to the accuracy reached with the graduated circle. Hence the Observatory continues to be the recognized critic of the performance of time-pieces, for nowhere else in the arts or sciences is the exact measurement of considerable intervals of time of such vital importance.

The instrument almost universally used in determining the time is the Astronomical Transit Instrument. Through the courtesy of the Director of Harvard College Observatory, we have before us to-night, a very beautiful specimen of this instrument, built by M. Herbst of Poulkova. You notice that it has but one motion, simply around this axis which points east and west, and makes a right angle with the telescope tube. Now as I take hold of the telescope, you see the telescope only moves from the north to the south, that is, in the meridian. If we suppose this axis to be perfectly horizontal,—and this delicate level which hangs from it will tell us if it is not so,—I think you will readily see that the astronomer has only to point the instrument so that it will have the same altitude as a star approaching the meridian, in order to have that star visible in the telescope as it crosses it. Now if we imagine the star to be exactly in the centre of the field of view of the telescope to-night, and if we do not move the telescope, to-morrow night at about this time, the same star will re-appear, and the interval between its two successive appearances is one sidereal day.

Unfortunately for our purpose Nature has not provided a visible meridian line, and accordingly the astronomer contrives a visible substitute. We have on the screen a circle of light, which fairly represents the circle of light you would see by placing your eye to the telescope. You will understand that it will take several minutes for the star to cross this circle of light, or what is the same thing, the field of view of the telescope. To tell when the star is in the middle of this field there is inserted in the telescope a fine spider's web, which divides the field of view into two parts, and which represents to the astronomer, as nearly as practicable, the meridian line on the heavens.

Practically instead of one line there are a number of

lines parallel to each other, so that the astronomer may be able to tell more exactly than he could by noting the transit over one line, exactly when the star crosses his approximate meridian. I say approximate meridian, because this middle line only marks the meridian within certain limits which are set by the principle which underlies all practical astronomy, that after human art is exhausted in rendering an instrument as perfect as possible, there are still measurable deviations from perfection itself. In the case of our transit we are unable to have it perfect in a single point; we cannot put the middle line of this group exactly in the centre of the true telescopic field of view. We cannot make this axis about which the telescope turns, perfectly horizontal, we cannot bring the telescope so that it shall move exactly in the meridian, and even if we could accomplish either of these three things, we should hardly have time to announce it, before that unseen motion which is constantly going on among the molecules of every body in the visible universe, would have disturbed it to an extent appreciable by the application of some refined method of investigation.

In order to measure our day, therefore, we must assure ourselves of the amount of change our instrument has undergone in that interval. This is accomplished by the observation of a number of stars distributed over the northern and southern heavens. We can compute from the discrepancies among such a series of stars the correction we should apply to each one of them, to get the same result we should have obtained in our measure of the day's length, if we had used a perfect instrument moving precisely in the meridian. Let us briefly consider the principles we should adopt to free our observation of a star of the errors springing from the three sources I have mentioned. First, we can determine how much that



middle line is away from the true centre of the telescope, by observing some pretty slow moving star near the pole as it crosses the first two wires of the group, we will say. Now we know the distance which these two wires are from this middle one, and we can therefore determine the time at which the star would cross the middle wire. We left our star slowly moving, and after it had passed the second wire, now suppose that we skilfully and rapidly lift our instrument out of its bearings and replace it with its horizontal axis end for end, and point the telescope upon the same star which has not yet crossed these last two wires. Now if you reflect a moment you will see that these are the same two wires across which we have first observed the star's transit, only they are now on the other side of the field of view, and if we now compute at what time the star crossed the middle wire from these last two transits we shall find that it differs from the time derived from the first two transits by twice the amount the middle line is from the true centre. Second, we can determine how nearly level this horizontal axis is by means of this very delicate spirit-level, which you see rests only on the axis itself. And third, we can determine how much our instrument (due allowance being made for the two preceding sources of error) still deviates from the meridian, by combining star transits taken near the pole and the equator. It is the habit of astronomers to consider a series of stars observed in this manner as constituting one time determination. And if our clock shows by its face that the sidereal day just measured has ended ten minutes too soon, then we say that our clock is ten minutes slow.

I think now you will understand me when I say that the first objection the astronomer has to observing the sun for time, is, that it is difficult to get enough stars in

the daytime to determine the position of the instrument, and another objection is found in the greater uncertainty attending the transit of the sun's limbs, which I think we can see on the screen.

We have here a beautiful photograph taken from the sun directly, and for which we are indebted to the skill of Lewis M. Rutherford, Esq. You will notice that the rounded limb of the sun cannot be so nicely bisected as can the image of this star which follows afterwards.

Let us now examine the method of noting the transit of a star across a wire. If I take this chronometer or that clock, I can count the beats as I sit with my eye to the telescope; and as the star crosses each wire I can note the second and the fraction of a second, and a skilful observer will only on rare occasions estimate this fraction a fifth of a second in error. It is better, however, to lessen the errors which depend upon the personality of the observer, such as his observing too fast or too slow, and to economize the time of writing down the observations, to record them automatically by means of the chronograph, an instrument first used in this connection by an American astronomer. We have a small one before us, and you see it consists of a metallic cylinder around which a sheet of paper is coiled, which is revolved uniformly by clock work. A glass fountain pen rests upon the surface of the paper, and as the cylinder revolves the pen draws a line upon it. Now if you conceive that this cylinder be slowly moved along at the same time that it revolves, you will understand that the pen never marks over the same part of the paper. Now suppose that this cylinder rotates just once in sixty seconds, and suppose that I cause this clock by means of an electric circuit to slightly move the pen at the beginning of each second; this will cause a slight notch in the line, which registers upon the paper the

beginning of each second, and if we omit the slight notch which would be made by the fifty-ninth second we can thus register the beginning of each minute. This telegraph key which I hold in my hand is in the same electric circuit with the clock and chronograph, and as this star is passing over the screen I can register its transits upon the chronograph by simply causing the pen to make a notch in the line by breaking the electric circuit. We have put a telegraphic sounder in the same circuit, so that I think you will be able to hear the beats of the clock quite to the other end of the hall. There comes our star, and as it crosses each wire you will hear the familiar telegraph tick which tells us that we have made the slight notch on the chronograph which records the star's transit. Now suppose that this slight notch we afterwards find occurs six-tenths of the way between the thirtieth and thirty-first second. Then we know that the star's transit occurred at thirty-one seconds and six-tenths of a second of a particular minute. After an evening's observation the sheet is removed from the cylinder, labelled, and filed away with the records of the Observatory.

Having obtained the error of our time-piece to within a twentieth of a single second, the next question is, How shall we keep the time-piece so that it will have the same error to-morrow night, that it has to-night; or failing in this, how shall we preserve the same relation between the errors on consecutive nights? In other words, how shall we know that the time-piece gains or loses regularly? This leads us to speak of the clocks and watches which keep the time from day to day. You all know that the test of the performance of any time-piece is found in noting the regularity with which it gains or loses. Thus a clock which gained ten seconds a day might be a very much better one than another which gained and lost alter-



nately ten seconds a day. Though at the end of a week the better clock would be a minute more in error than the second one. The point I wish to illustrate is that with an accurate time-piece we can always predict what its error will be, for some days in advance. While with a poor time-piece we can form no idea from the determination of its error on two nights, what it will be on a third one. Now it is to the elimination of the sources of error in clocks and watches that the attention of the artisan is directed; and the practical form which successive improvements take is in more perfectly protecting our time-pieces from the effects of temperature changes, and from those resulting from variations of friction in the movement. In the clock we endeavor to guard against the effects of temperature on the pendulum, by uniting two metals in such a way that one expands upwards while the other expands downwards, and they are so adjusted that the centre of the pendulum stays very nearly in the same position. Now, although the clock is the most perfect time-piece we have, yet it is still liable to the theoretical objection that its pendulum swings in a circular instead of a cycloidal arc. You will be interested to know, that the finest clocks for astronomers' uses are so sensitive to external influences that if the barometer were to change an inch in height, it would cause a variation in the clock's rate of about a quarter of a second per day, and I might mention that in some large observatories the standard clock is kept in a cellar vault to avoid changes of temperature and in an hermetically sealed glass case, from which the air has been partially exhausted. At the Harvard Observatory the clock which distributes the signals to Boston and along the lines of the railroads and consequently to Salem as well, is placed in the cellar inside of a thick walled room which has a floor of sheet lead, its

walls filled with dry sand and its door joints packed with felt. Here is the record of the performance of a sister clock by the same makers in the Liverpool Observatory. After making the correction for barometric pressure the average of the daily rates in 1876 for the month of March was six one-hundredths of a second; for April, five hundredths; for May, seven hundredths; for June, eight hundredths; for July, eight hundredths.

Before showing how these clocks are used for distributing public time, let us consider for a moment the performance of watches and chronometers. I suppose that six men out of seven consider the subject of the performance of watches their specialty. At least it has been my fortune to meet a number of gentlemen with costly watches which ran so well that they were superior to the finest astronomical clocks. This somewhat surprising result was obtained by accepting their sincere testimony that in six weeks their watches actually had not varied a second. And one gentleman informed me, with some evident embarrassment, that he had detected an error of some twenty seconds in the time received from the Observatory which he had heretofore supposed to be very exact.

We are here reminded of Charles Dudley Warner's words: "We constantly compare our watches, and are anxious that they should not gain or lose a second. A person feels his own importance increased if he owns an accurate watch. There is nothing that a man resents more than the disparagement of his watch. (It occurs to me, by the way, that the superior attractiveness of women, that quality of repose and rest which the world finds in them, springs from the same amiable *laissez aller* that suffers their watches never to be correct. When the day comes that women's watches keep time there will be no peace in this world.) When two men meet, one of the

most frequent interchanges of courtesies is to compare watches ; certainly if the question of time is raised, as it is sure to be shortly among a knot of men with us, every one pulls out his watch, and comparison is made. We are in fact, the slaves of time, and of fixed times. We think it a great loss and misfortune to be without correct time ; and if we are away from the town-clock and the noon-gun, in some country place, we importune the city stranger, who appears to have a good watch, for the time ; or we lie in wait for the magnificent conductor of the railway express, who always has the air of getting the promptest time from headquarters."

Let us examine the parts of a watch as we have them upon the screen. [Here a watch-movement in full motion was projected upon the screen and Mr. Waldo explained the various parts.] We are indebted to the Mechanical Superintendent of the Waltham Watch Factory for this very interesting exhibition of a watch in motion, projected against the screen. The chronometer, either marine or pocket, is superior to any other form of watch made, if we consider only its performance when it is kept in one position ; but it is inferior to almost any other well made form of watch if it is constantly exposed to the jar of the person in walking or running. The precision attained in the very finest of pocket chronometers is surprising ; thus, the mean daily variation in the rates of the two best chronometers exhibited by the American Watch Co. at the Philadelphia Centennial Exposition were twelve and fourteen one-hundredths of a second, respectively. Quoting from a recent report of the Neuchatel Observatory on the annual competition of Swiss chronometers for prizes awarded yearly by the Observatory, the two best pocket chronometers had an average daily variation in their rates of thirteen and seventeen one-hundredths of



a second respectively. These rates would not discredit an astronomical clock. We have now considered the methods of determining exact time, some of the precautions necessary to keep it, and our last division of the subject will be how to distribute it without sensible error.

We have been talking in describing star transits, of Sidereal or Star Time, and since the stars rise four minutes earlier every day, the sidereal day is four minutes shorter than our common day. Now it is common or mean time which we want to distribute, so first we must convert the sidereal time into mean time. We have here a mean-time clock loaned through the courtesy of Messrs. E. Howard & Co. Within this clock is an arrangement for breaking the electric circuit each alternate second except the fifty-eighth. We have also here a chronometer provided with a similar break circuit arrangement, and we shall cause both of these time-pieces to register their beats upon this telegraphic sounder. Now the sidereal clock beating faster than the mean-time clock very soon catches up with it, and for a few seconds they beat so closely together that we can compare them to within one one-hundredth of a second. And now we are able by a short calculation, and knowing the error of the sidereal clock, to exactly determine the error of the mean-time clock, which latter error we can reduce to nothing by altering the clock. Thus we have a mean-time clock set perfectly to mean time, and by means of an electric circuit ready to automatically distribute its beats over as long a circuit as we choose.

We have about the hall a miniature telegraph line with telegraphic instruments at two or three points, which if you please we will imagine to be Boston, Springfield, and New York. We have only to switch the clock into this circuit, with some precaution to avoid the strong battery

power used, and you hear immediately the beats of the clock registering themselves at each station. In order to distinguish the beginning of the minute the fifty-eighth second is omitted. In addition to this omission in the Harvard Observatory system, the clock omits twenty-six seconds immediately preceding of each five minutes. For a single signal it is customary to resort to the time ball, or to the time gun, both of which require considerable mechanism which shall act automatically from the clock. I think we can illustrate the first of these methods by means of the simple ball you see suspended before you. It should be electrically released the instant the second hand of the clock reaches the beginning of the minute. In regard to the gun, the Astronomer Royal for Scotland observes, "You would do well, if you can, to pull the trigger of a time-gun, for there are no means under Heaven equal to a gun, for speaking to human nature and obliging it to attend."

We have extemporized also a gun in an adjoining yard, which in the cause of science the clock should discharge at the instant of the commencement of the next minute. We have left untouched great divisions in the art of measuring and disseminating time, but a regard for the subject of my lecture reminds me I must close. Much of the pleasure in the experiments of the evening is owing to the generous help of Mr. R. W. Willson, of the Department of Physics, and Mr. Winslow Upton, of the Observatory of Harvard University. Are we not reminded, in our efforts to measure an hour, that, "Time is the measure of all things, but is itself immeasurable, and the grand discloser of all things, but is itself undisclosed?"

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LIST OF THE  
NORTH AMERICAN CRUSTACEA

Belonging to the Suborder Caridea.

BY J. S. KINGSLEY.

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THE following list is intended to embrace all the described species of shrimps which have been found in the waters of North America, from the Arctic regions to the Isthmus of Panama, with their principal synonyms and geographical range.

SUB-ORDER CARIDEA.

FAMILY CRANGONIDÆ.

SUBFAMILY Crangoninæ.

GENUS CRANGON *Fabricius*.

1. *Crangon vulgaris* *Fabricius*, Suppl. Ent. Syst., 1798, p. 410.  
Edwards, Hist. Nat. des Crustacés, 1837, ii, p. 341. Gould, Inverte-



brata of Mass., 1841, p. 331. Gibbes, Proc. Amer. Assoc. Adv. Sci., 1851, iii, p. 195. Smith, Rep. U. S. Fish Comm., 1871-2, p. 551, pl. III, f. 10. Kingsley, Proc. Phil. Acad., 1878, p. 89. *Crangon septemspinus* Say, Jour. Phila. Acad., 1818, i, p. 246. Dekay, N. Y. Fauna, Crustacea, 1844, p. 25, pl. viii, f. 24.

North Carolina to Labrador and Europe.

2. *Crangon alaskensis* Lockington, Proc. Cal. Acad., 1876.

Alaska.

Having only extras of Mr. Lockington's papers (the volume containing them not being yet issued), I am not able to quote the pages on which his descriptions occur.

3. *Crangon nigricauda* Stimpson, Proc. Cal. Acad., 1855, i, p. 89; Jour. Bost. Soc. Nat. Hist., 1857, vi, p. 496, pl. XXII, f. 6; Proc. Phila. Acad., 1860, p. 25. Streets and Kingsley, Bulletin Essex Inst., 1877, ix, p. 108. *Crangon vulgaris* Owen, Beechey's Voyage, 1839, p. 87. Dana, U. S. Expl. Ex. Crust., 1852, p. 536. *Crangon nigromaculata* Lockington, Proc. Cal. Acad., 1876, p. —. *Steiracrangon nigricauda* Kinahan, Proc. Roy. Irish Acad., 1868, p. 68.

California to Washington Territory.

(I am inclined to consider the three species above as the same, but need larger series to decide.)

4. *Crangon franciscorum* Stimpson, Proc. Cal. Acad., 1855, i, p. 89; Jour. B. S. N. H., 1857, vi, p. 495, pl. XXII, f. 5; Proc. Phila. Acad., 1860, p. 25.

California to Washington Territory.

5. *Crangon munitus* Dana, U. S. Expl. Ex. Crust., 1852, p. 536, pl. XXXIII, f. 5. Stimpson, Jour. B. S. N. H., 1857, vi, p. 497. *Cheraphilus munitus* Kinahan, Proc. Roy. Irish Acad., 1868, p. 68.

Washington Territory.

6. *Crangon boreas* Fabricius, Suppl. Ent. Syst., 1798, p. 410. Edwards, Hist. Nat. des Crust., 1837, ii, p. 342. Kroyer, Naturhistorisk Tidsskrift, 1842-3, iv, p. 218, pl. IV, f. 1-14. Dekay, N. Y. Fauna, Crustacea, 1844, p. 26. Stimpson, Invert. Gd. Menan, 1853, p. 58; Proc. Phila. Acad., 1860, p. 25. *Cancer boreas* Phipps, Voyage, North Pole, 1774, p. 190, pl. XII, f. i. *Astacus boreas* Olivier, Encyc. Methodique, v, p. 346. *Cancer homaroides* O. Fabricius, Fauna Grön-

landica, 1780, p. 241. *Cheraphilus boreas* Kinahan, Proc. Roy. Irish Acad., 1868, viii, p. 68.

Massachusetts Bay, Labrador, Arctic Seas, Behrings Straits.

The Genus *Cheraphilus*, as limited by Kinahan, is not co-extensive with the *Pontophilus* of Leach and Sars, and has not a single character common to all the species to separate it from *Crangon* as restricted by him. Neither does the fact that Dr. Leach abandoned his genus *Pontophilus* and the subsequent use of that name by Risso and Brandt for certain *Pandali* affect the case in the least, as regards the proposed name, which has been adopted by Miers (Ann. and Mag. Nat. Hist., 1877, IV, xix, p. 133). I accept the genus *Pontophilus* as limited by Sars (Forhandl. Vidensk. Selsk. i Christiania, 1861, p. 183).

#### GENUS SABINEA Owen.

7. *Sabinea septemcarinata* Owen, Appendix Ross 2nd Voyage, 1835, p. 82. Kroyer, N. H. Tidsskr., 1842-3, iv, p. 244, pl. IV, f. 34-40. Stimpson, Proc. Phila. Acad., 1860, p. 26. Smith, Trans. Conn. Acad., 1874, iii, p. 28. *Crangon septemcarinatus* Sabine, Appendix No. X to Parry's 1st Voyage, 1826, p. 58, pl. II, f. 11-13; Edw. Hist. Nat. Crust., 1837, ii, p. 343.

Massachusetts Bay, Arctic Seas, Siberia.

#### GENUS NECTOCRANGON Brandt. (*Argis* Kroyer).

8. *Nectocrangon lar* Brandt, in Middendorff's Siberische Reise, 1852, p. 115. Stimpson, Proc. Phila. Acad., 1860, p. 25; Annals N. Y. Lyc., 1871, x, p. 125. *Crangon lar* Owen, Beechey's Voyage, 1839, p. 88, pl. XXVIII, f. 1. *Argis lar* Kroyer, Nat. Hist. Tidsskr., 1842-3, iv, p. 255, pl. V, f. 45-62.

Arctic Seas, Newfoundland, Behrings Straits.

#### GENUS PARACRANGON Dana.

9. *Paracrangon echinatus* Dana, U. S. Expl. Ex. Crust., 1852, p. 538, pl. XXXIII, f. 6. Stimpson, Jour. B. S. N. H., 1857, vi, p. 497.

Puget Sound.

SUBFAMILY *Lysmatinæ*.GENUS *HIPPOLYSMATA* Stimpson.

10. *Hippolysmata californica* Stimpson, Proc. Chicago Acad., I, 48 (teste Stm.); Ann. N. Y. Lyc., 1871, x, p. 123.

California.

11. *Hippolysmata wurdemanni* Stimpson, Annals N. Y. Lyc., 1871, x, p. 124. *Hippolyte wurdemanni* Gibbes, Proc. Am. Assoc. Adv. Science, 1851, iii, p. 197.

Florida.

12. *Hippolysmata intermedia* Kingsley, Proc. Phila. Acad., 1878, p. 90.

Florida.

13. *Hippolysmata cubensis* Kingsley, Proc. Phila. Acad., 1878, p. 89. *Hippolyte cubensis* E. von Martens, Wiegmann's Archiv für Naturgeschichte, 1872, p. 136, pl. V, f. 14.

Cuba.

GENUS *TOZEUMA* Stimpson.

14. *Tozeuma carolinensis* Kingsley, Proc. Phila. Acad., 1878, p. 90.

North Carolina.

GENUS *RHYNCHOCYCLUS* Stimpson.

15. *Rhynchocyclus parvulus* Stimpson, Annals N. Y. Lyc., 1871, p. 124.

Texas.

GENUS *LATREUTES* Stimpson.

16. *Latreutes ensiferus* Stimpson, Proc. Phila. Acad., 1860, p. 27. *Hippolyte ensiferus* Edwards, Hist. Nat. des Crustacés, 1837, ii, p. 374.

On Gulf weed, Atlantic.

FAMILY *ATYIDÆ*.SUBFAMILY *Atyinæ*.GENUS *ATYA* Leach.

17. *Atya scabra* Leach, Trans. Linn. Soc., XI, p. 345 (teste



Edw.). Edwards, Hist. Nat. des Crust., 1837, ii, p. 348, pl. XXIV, f. 15-19. Newport. Ann. and Mag. Nat. Hist., 1847, xix, p. 159. Stimpson, Jour. B. S. N. H., 1857, vi, p. 498. *Atya mexicana* Wiegmann, Archiv für Naturgeschichte, 1836, i, p. 145.

Fresh water, western Mexico.

18. *Atya punctata* Kingsley, Proc. Phila. Acad., 1878, p. 91.

Hayti.

19. *Atya occidentalis* Newport, Ann. and Mag. Nat. Hist., 1847, xix, p. 159. Kingsley, Proc. Phila. Acad., 1878, p. 92.

West Indies.

20. *Atya rivalis* Smith, 3rd Report Peab. Acad. Sci., 1871, p. 94.

West coast Nicaragua.

21. *Atya tenella* Smith, 3rd Rep. P. A. S., 1871, p. 94.

West coast Nicaragua.

#### GENUS EVATYA Smith.

22. *Evatya crassa* Smith, 3rd Rep. P. A. S., 1871, p. 95.

West coast Nicaragua.

#### GENUS ATYOIDA Randall.

23. *Atyoida mexicana* Stimpson, Am. Jour. Sci. and Arts, 1859, xxvii, p. 446. *Caradina mexicana* Saussure, Crust. Antilles et Mex., 1858, p. 45, pl. IV, f. 26.

Mexico.

### FAMILY PALÆMONIDÆ.

#### SUBFAMILY Alpheinæ.

#### GENUS ALPHEUS Fabricius, Kingsley.

24. *Alpheus minus* Say, Jour. Acad. Nat. Sci., 1818, i, 245. Edwards, Hist. Nat. des Crust., 1837, ii, 356. Kingsley, Bulletin U. S. Geological and Geographical Survey of the Territories, 1878, Vol. iv, No. 1, p. 190. *Alpheus formosus* Gibbs, l. c., 196.

North Carolina, Bermudas, West Indies, Florida, Bay of Panama.

25. *Alpheus panamensis* Kingsley, l. c., p. 192.  
West coast Central America and Panama.
26. *Alpheus sulcatus* Kingsley, l. c., p. 193.  
Panama, Peru.
27. *Alpheus floridanus* Kingsley, l. c., p. 193.  
Florida.
28. *Alpheus heterochelis* Say, l. c., 1818, i, p. 243. Edwards, op. cit., 1837, ii, p. 356. Kingsley, l. c., p. 194. *Alpheus armillatus* Edw., op. cit., p. 354. *Alpheus lutarius* Saussure, Crust. Antilles et Mex., 1858, p. 45, pl. III, f. 24. *Halopsyche lutaria* Sauss. Revue Zoologique, 1857, 100.  
No. Carolina, Florida, W. Indies, Aspinwall, Brazil, Panama.
29. *Alpheus normanni* Kingsley, Proc. Phila. Acad., 1878, p. 93. *Alpheus affinis* Kingsley (non Guise) Bulletin U. S. Geol. Survey, 1878, p. 195.  
Panama.
30. *Alpheus transversodactylus* Kingsley, l. c., p. 196.  
California, Bermudas.
31. *Alpheus parvimanus* Kingsley, l. c., 195.  
Panama.
32. *Alpheus cylindricus* Kingsley, l. c., 196.  
Panama.
33. *Alpheus clamator* Lockington, Proc. Cal. Acad., 1876. Kingsley, l. c., 197.  
California.
34. *Alpheus longidactylus* Kingsley, l. c., 193. *Betæus longidactylus* Lockington, l. c., 1876.  
California.
35. *Alpheus harfordi* Kingsley, l. c., 198. *Betæus equimanus*

Lockington (non Dana), Proc. Cal. Acad., 1876. *Alpheus equalis* Kingsley, l. c., p. 199 (*teste* Lockington in letter).

California.

**36. *Alpheus equidactylus*** Lockington, l. c., 1876.

California.

**37. *Alpheus bellimanus*** Lockington, l. c., 1876.

California.

**38. *Alpheus bispinosus*** Streets, Proc. Phila. Acad., 1872, p. 242 (= *?A. heterochelis*).

Isthmus of Panama.

GENUS CARIDION Göes (*Doryphorus* Norman, non Cuv.).

**39. *Caridion gordonii*** Göes, Crustacea decapoda podophth. marina Sueciæ (Acad. Sci. Suec., 1863), p. 10. Smith, Trans. Conn. Acad., 1874, iii, p. 28. *?Hippolyte gordonii* Sp. Bate, Nat. Hist. Rev., v, p. 52. *Doryphorus gordonii* Norman, Ann. and Mag. Nat. Hist., III, viii, p. 276.

Northern Atlantic.

GENUS HIPPOLYTE Leach (restrict.).

**40. *Hippolyte pusiola*** Kroyer, Monograph Fremstilling Hippolyte, etc., 1842, p. 319, pl. II, f. 69-73. Stimpson, Ann. N. Y. Lyceum, 1871, x, 127. Smith, Rep. U. S. Fish Comm., 1871-2, p. 550.

Europe, Greenland, south to Vineyard Sound.

**41. *Hippolyte fabricii*** Kroyer, Nat. Hist. Tidsskrift, iii, p. 571; Monograph, 1842, p. 277, pl. I, f. 12-20. Stimpson, Ann. N. Y. Lyc., 1871, x, p. 126.

Massachusetts Bay northward to Europe.

**42. *Hippolyte suckleyi*** Stimpson, Proc. Phila. Acad., 1864, p. 154.

Puget Sound.

**43. *Hippolyte gaimardii*** Edw., Hist. Nat. des Crust., 1837, ii, p. 378. Kroyer, N. H. Tidsskr., 1840-41, iii, p. 572; Monograph, 1842, p. 282, pl. I, f. 21-29. Göes, Crust. Podophth. Suec., 1863, p. 8.



Stimpson, Ann. N. Y. Lyc., 1871, x, p. 126. *Hippolyte gibba* Kr., N. H. Tidsskr., 1840-41, iii, p. 572; Monograph, 1842, p. 288, pl. I, f. 30-37. Stimpson, Proc. Phil. Acad., 1860, p. 35; 1863, p. 139. *Hippolyte belcheri* Bell, in Belcher, last of the Arctic Voyages, 1855, ii, p. 402, pl. 34, f. 1.

Arctic Seas south to Massachusetts Bay.

44. *Hippolyte incerta* Buchholz, Zweite deutsche Nordpolarfahrt, 1874, p. 272.

Greenland.

45. *Hippolyte prionota* Stimpson, Proc. Phila. Acad., 1864, p. 153.

Puget Sound.

46. *Hippolyte spina* White, List Crustacea in British Museum, p. 76. Stimpson, Proc. Phila. Acad., 1860, p. 34; Ann. N. Y. Lyc., 1871, x, p. 126. *Cancer spinus* Sowerby, Brit. Miscellany, 1806, p. 47, pl. XXIII. *Alpheus spinus* Leach, Edinburgh Encyclopedia, 1813-14, vii, p. 431. *Hippolyte sowerbei* Leach, Malacos. Podophth. Britt., 1815-17, pl. XXXIX. Edw., Crustacea, 1837, ii, p. 380. Kroyer, Monograph, 1842, p. 298, pl. II, f. 45-54. Dekay, N. Y. Fauna, Crustacea, 1842, p. 27.

Massachusetts Bay to Arctic Seas and Europe.

47. *Hippolyte macilenta* Kroyer, Nat. Hist. Tidsskrift, 1840-41, iii, p. 574; Monograph, 1842, p. 305, pl. II, f. 55-56.

Greenland.

48. *Hippolyte vibrans* Stimpson, Annals N. Y. Lyc., 1871, x, p. 125.

Massachusetts Bay.

49. *Hippolyte phippsii* Kroyer, N. H. Tidsskr., 1840-41, iii, p. 575; Monograph, 1842, p. 314, pl. III, f. 64-68. Stimpson, Proc. Phila. Acad., 1863, p. 139.

Arctic.

50. *Hippolyte turgida* Kroyer, N. H. Tidsskr., 1840-41, iii, p. 575; Monograph, p. 308, pl. II, f. 57-58, pl. III, f. 59-63. Stimpson, Proc. Phila. Acad., 1860, p. 34; 1863, p. 139.

Arctic.

**51. *Hippolyte stylus*** Stimpson, Proc. Phila. Acad., 1864, p. 54.  
Puget Sound.

**52. *Hippolyte polaris*** Owen, Appendix, Ross 2nd Voy., 1835, p. 85. Edw., Hist. Nat. Crust., 1837, ii, p. 376. Kroyer, Monograph, 1842, p. 324, pl. III, f. 78-81; pl. IV, f. 82. Stimpson, Proc. Phila. Acad., 1860, p. 33; 1863, p. 139. *Cancer squilla* var.  $\beta$ . Fabr., Fauna Grönlandica, 1780, p. 239. *Alpheus polaris* Sabine, Parry's Voyage, 1821, p. 238, pl. II, f. 5-8.

Arctic.

**53. *Hippolyte borealis*** Owen, App. Ross 2nd Voy., 1835, p. 84, pl. B, f. 3. Edw., Hist. Nat. des Crust., 1837, ii, p. 372. Kroyer, Monograph, 1842, p. 330, pl. III, f. 74-77. Stimpson, Proc. Phila. Acad., 1860, p. 33; 1863, p. 139.

Greenland, Behrings Straits.

(Göes and Buchholz are inclined to believe this the same as the preceding.)

**54. *Hippolyte taylori*** Stimpson, Jour. Bost. Soc. Nat. Hist., 1857, vi, p. 500.

California.

**55. *Hippolyte brevirostris*** Dana, U. S. Expl. Ex. Crust., 1851, p. 556, pl. XXXVI, f. 5. Stimpson, Proc. Cal. Acad., i, 1856, p. 89; Jour. Bost. Soc., 1857, vi, p. 500; Proc. Phila. Acad., 1860, p. 33.

Pacific coast, U. S.

**56. *Hippolyte grönlandica*** Miers, Ann. and Mag. Nat. Hist., 1877, IV, xx, p. 62. *Astacus grönlandicus* J. C. Fabricius, Entomo Systemat., 1775, p. 416 (teste Miers). *Cancer aculeatus* O. Fabricius, Fauna grönlandica, 1780, p. 289. *Alpheus aculeatus* Sabine, Parry's 1st Voy., 1821, p. 237, pl. II, f. 9-10. *Hippolyte aculeata* Owen, App. Ross 2nd Voy., 1835, p. 83. Edw., H. N. Crust., 1837, ii, p. 380. Kroyer, Monograph, 1842, p. 334, pl. IV, f. 83-98; pl. V, f. 99-104. Gould, Invertebrata of Mass., 1841, p. 332. Dekay, op. cit., 1843, p. 27, pl. IX, f. 31. Stimpson, Invertebrata of Grand Menan, 1853, p. 58; Proc. Phila. Acad., 1860, p. 33; 1863, p. 139. *Hippolyte armata* Owen, Beechey's Voy., 1839, p. 88, pl. XXXVII, f. 2 (♀). *Hippolyte cornuta* Owen, Beechey's Voyage, 1839, p. 89, pl. XXXVIII, f. 2 (♂).

Northern Seas.

57. *Hippolyte cristata* Stimpson, Proc. Phila. Acad., 1860, p. 33.

California.

58. *Hippolyte microceros* Kroyer, Nat. Hist. Tidsskrift, 1840-41, p. 578; Monograph, 1842, p. 341, pl. V, f. 105-9.

Greenland.

59. *Hippolyte palpator* Owen, Beechey's Voy., 1839, p. 89, pl. XXVIII, f. 3. Stimpson, Proc. Cal. Acad., 1856, i, p. 89; Jour. Bost. Soc. Nat. Hist., 1857, vi, p. 499.

California.

60. *Hippolyte picta* Stimpson, Ann. N. Y. Lyc., 1871, x, p. 125.

California.

61. *Hippolyte sitchensis* Brandt, in Middendorff's Siberische Reise, 1851, p. 116. Stimpson, Jour. Bost. Soc., 1857, vi, p. 499.

Pacific coast.

62. *Hippolyte layi* Owen, Beechey's Voyage, 1839, p. 90, pl. XXVII, f. 3. Stimpson, Jour. Bost. Soc., 1857, vi, p. 499.

California.

63. *Hippolyte panschii* Buchholz, Zweite Deutsche Nordpolarfahrt, 1871, p. 277, pl. I, f. 1.

Greenland.

64. *Hippolyte lamellicornis* Dana, U. S. Expl. Ex. Crust., 1851, p. 567, pl. XXXVI, f. 6. Stimpson, Jour. Bost. Soc., 1857, vi, p. 498.

Puget Sound.

65. *Hippolyte affinis* Owen, Beechey's Voyage, 1839, p. 90, pl. XXVII, f. 4. Stimpson, Jour. Bost. Soc., 1857, vi, p. 498.

California.

66. *Hippolyte gracilis* Stimpson, Proc. Phila. Acad., 1864, p. 155.

Puget Sound.

67. *Hippolyte esquimaltiana* Spence Bate, Proc. Zool. Soc., London, 1864, p. 666.

Vancouver Island.



68. ?*Hippolyte hemphilli* Lockington, l. c., 1876.  
California.

GENUS *VIRBIUS* Stimpson.

69. *Virbius acuminatus* Stimpson, Proc. Phila. Acad., 1860, p. 35. *Hippolyte acuminata* Dana, U. S. Expl. Ex. Crust., 1851, p. 562, pl. XXXVI, f. 1.

Gulf weed, Atlantic.

70. *Virbius pleuracanthus* Stimpson, Annals N. Y. Lyc. Nat. Hist., 1871, x, p. 127.

New Jersey, Virginia.

71. *Virbius zostericola* Smith, Rep. U. S. Fish Comm., 1871-2. p. 550, pl. III, f. 11.

Vineyard Sound.

SUBFAMILY *Pandalinæ*.

GENUS *PANDALUS* Leach.

72. *Pandalus annulicornis* Leach, British Malacostraca, f. 40, Edw., Hist. Nat. des Crust., 1837, ii, p. 384. Dekay, op. cit., 1842, p. 28, pl. VII, f. 18. Smith, U. S. Fish Commission, 1872-3, p. 550, pl. II, f. 6.

Europe, Greenland, south to Vineyard Sound.

73. *Pandalus borealis* Kroyer, Nat. Hist. Tidssk., 1841-2, ii, p. 254. Brandt, Siberische Reise, 1851, p. 122. Stimpson, Jour. Bost. Soc. Nat. Hist., 1857, vi, p. 501; Annals N. Y. Lyceum, 1871, x, p. 128.

Greenland, Alaska, Massachusetts Bay.

74. *Pandalus franciscorum* Kingsley, Proc. Phila. Acad., 1878, p. 94.

San Francisco.

75. *Pandalus pubescentulus* Dana, U. S. Expl. Ex. Crust., 1851, p. 568, pl. XXXVI, f. 8. Stimpson, Jour. Bost. Soc. Nat. Hist., 1857, vi, p. 501.

Washington Territory.

76. *Pandalus gurneyi* Stimpson, Annals N. Y. Lyc., 1871, x, p. 128.

Monterey, Cal.

77. *Pandalus platyceros* Brandt, op. cit., 1851, p. 123. Stimpson, Jour. Bost. Soc. Nat. Hist., 1857, vi, p. 502.

Alaska.

78. *Pandalus hypsinotus* Brandt, op. cit., 1851, p. 125. Stimpson, Jour. Bost. Soc. Nat. Hist., 1857, vi, p. 502.

Alaska.

79. *Pandalus danæ* Stimpson, Proc. Bost. Soc., 1857, vi, p. 89; Jour. Bost. Soc., 1857, vi, p. 502, pl. XXI, f. 6 and 7.

Puget Sound.

80. ? *Pandalus lævigatus* Stimpson, Invertebrata of Grand Menan, 1853, p. 58.

Grand Menan.

(Prof. S. I. Smith thinks this a large specimen of *P. annulicornis* Leach, with color notes derived from some species of Hippolyte. Dr. Stimpson ignored it in his later papers.)

#### SUBFAMILY Thorinæ.

I propose this division for the reception of the genus *Thor*. It is characterized by having the carpus of the second pair of thoracic feet annulate and smaller than the first, and by the absence of a mandibular palpus.

#### GENUS THOR Kingsley.<sup>1</sup>

81. *Thor floridanus* Kingsley, Proc. Phila. Acad. Nat. Sci., 1878, p. 95.

Florida.

#### SUBFAMILY Pontoninæ.

I would propose this subfamily to embrace the genera *Pontonia* Latr., *Coralliocaris* Stimpson (= *Oedipus* Dana), *Harpilius* Dana, *Euryrhynchus* Miers, *Anchistia*

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<sup>1</sup> Proceedings Philadelphia Academy of Natural Sciences, 1878, p. 94.

Dana, *Palæmonetes* Heller, *Urocaris* Stimpson, and *Tyton* Costa; genera which have the second pair of thoracic feet larger than the first, the carpus never annulate and the mandible without a palpus.

GENUS PONTONIA *Latreille.*

82. *Pontonia domestica* *Gibbes*, Proc. Am. Assoc. Adv. Sci., 1851, iii, p. 196. *Kingsley*, Proc. Acad. Nat. Sci., Philadelphia, 1878, p. 95.

South Carolina, Florida.

83. *Pontonia margarita* *Smith*, American Naturalist, 1869, iii, p. 245.

Panama.

GENUS ANCHISTIA *Dana.*

84. *Anchistia americana* *Kingsley*, Proc. Acad. Nat. Sciences, Philadelphia, 1878, p. 96.

Florida.

GENUS UROCARIS *Stimpson.*

85. *Urocaris longicaudata* *Stimpson*, Proc. Acad. Nat. Sci., Philadelphia, 1860, p. 39.

Carolina.

GENUS PALÆMONETES *Heller.*

86. *Palæmonetes vulgaris* *Stimpson*, Annals N. Y. Lyceum, 1871, x, p. 129. *Smith*, U. S. Fish Comm., 1871-2, p. 550, pl. II, f. 9. *Palæmon vulgaris* *Say*, Jour. Acad. Nat. Sci., Philadelphia, 1818, i, p. 248.

Massachusetts Bay to Florida.

87. *Palæmonetes carolinus* *Stimpson*, Annals. N. Y. Lyceum, 1871, x, p. 129.

New Jersey to South Carolina.

88. *Palæmonetes paludosa* *Kingsley*, Proc. Acad. Nat. Sci., Philadelphia, 1878, p. 97. *Hippolyte paludosa* *Gibbes*, Proc. A. A. A. S., 1851, iii, p. 197. *Palæmonetes exilipes* *Stimpson*, Ann. N. Y. Lyc., 1871, x, p. 130. *Smith*, Rep. U. S. Fish Comm., 1872-3, p. 641, pl. I, f. 1.



Fresh water, Florida, South Carolina, Lake Erie, Lake Michigan.

SUBFAMILY *Palæmoninæ*.

(Including the genera *Leander* Desmarest, *Palæmon* (pars Fabr.) Stimpson, *Hymenocera* Latreille, and *Cryphiops* Dana; which have the second pair of thoracic feet larger than the first, the carpus never annulate, and the mandible with a palpus.)

GENUS *LEANDER* Desmarest.

**89.** *Leander tenuicornis* Smith (in letter), *Palæmon tenuicornis* Say, Jour. Acad. Nat. Sci., Philadelphia, 1818, i, p. 249. *Palæmon natator* Edwards, Hist. Nat. des Crust., 1837, ii, p. 393. Goodsir, Ann. and Mag. Nat. Hist., 1845, II, xv, p. 74, pl. VII, f. 3. Dana, U. S. Expl. Ex. Crust., 1852, i, p. 588, pl. XXXVIII, f. 11. *Palæmon tenuirostris* Edw., op. cit., p. 395. *Leander erraticus* Desmarest, Annales Entomolog. Soc. de France, 1849, vii, p. 87. *Leander natator* Stimpson, Proc. Acad. Nat. Sci. Phila., 1860, p. 40.

Gulf weed, Atlantic.

**90.** *Leander pandaliformis* Stimpson, Annals N. Y. Lyc., 1871, x, p. 130.

West Indies.

**91.** *Leander gracilis* Smith, 2nd and 3rd Report Peab. Acad. Sci., 1871, p. 97.

West coast Nicaragua.

GENUS *PALÆMON* Fabricius, Stimpson.

In the Proceedings of the Zoological Society of London, 1868, p. 363, Mr. C. Spence Bate proposed a new genus (*Macrobrachium*) for certain *Palæmons*, in which the second pair of thoracic feet are enormously developed, but here, as in most cases where comparative measurements are made the basis of division, the various forms intergrade so that the separation cannot be made. Mr.

Bate also says that his forms are from fresh water, but species in which the same development may be observed (*P. spinimanus*, *grandimanus*, *jamaicensis*, *forceps*, etc., etc.) are far from being uncommon in salt water.

**92. *Palæmon forceps*** *Edw.*, Hist. Nat. des Crust., 1837, ii, p. 397. *Saussure*, Crust. Mex. et Ant., 1858, p. 51. *Smith*, Trans. Conn. Acad., 1869, p. 24. *Palæmon dasydactylus* *Streets*, Proc. Phila. Acad., 1871, p. 225, pl. II, f. 3.

Gulf of Mexico, West Indies, Brazil.

**93. *Palæmon consobrinus*** *Saussure*, l. c., p. 53.

Gulf of Mexico.

**94. *Palæmon mexicanus*** *Saussure*, l. c., p. 52, pl. IV, f. 27.

Coast of Mexico.

**95. *Palæmon sexdentatus*** *Streets*, Proc. Phila. Acad., 1871, p. 226, pl. II, f. 4.

Isthmus of Tehuantepec.

I am inclined to believe this to be (as suggested by Dr. Streets) a variety of the preceding species.

**96. *Palæmon tenellus*** *Smith*, Second and Third Reports of the Peabody Academy of Science, 1871, p. 98.

West coast of Nicaragua.

**97. *Palæmon ohionis*** *Smith*, Rep. U. S. Fish Comm., 1872-3, p. 640. *Forbes*, Bulletin No. 1 Illinois Museum of Natural History, 1876, p. 5.

Ohio and Mississippi Rivers.

**98. *Palæmon spinimanus*** *Edw.*, Hist. Nat. des Crust., 1837, ii, p. 399.

West Indies, Brazil.

**99. *Palæmon faustinus*** *Saussure*, l. c., 1858, p. 53, pl. IV, f. 30, Hayti.

I am unable, without specimens, to separate this from

*P. spinimanus*. Edwards' description agrees well with that of Saussure and also with his figure.

100. *Palæmon jamaicensis* Olivier, *Encyclopedie Methodique*, t. vili (*teste* Edw.). Edw., *Hist. Nat. des Crust.*, 1837, ii, p. 398. Saussure, l. c., p. 49. Smith, *Trans. Conn. Acad.*, 1869, ii, p. 23; 2nd and 3rd Report Peab. Acad. Sci., 1871, p. 97.

West Indies, Gulf of Mexico, Brazil, west coast of Nicaragua. (There is a specimen in the Museum of the Peabody Academy at Salem, Mass., brought by the late Prof. Orton from the junction of the Napo and Marañon rivers.)

101. *Palæmon aztecus* Saussure, l. c., 1858, p. 50, pl. IV, f. 29. Vera Cruz, Mexico.  
(Is this distinct from the last?)

102. *Palæmon brachydactylus* Wiegmann, *Archiv für Naturgeschichte*, 1836, II, i, p. 148. *Macrobrachium americanum* Spence Bate, *Proc. Zool. Soc.*, London, 1868, p. 363, pl. XXX.

Fresh water of Mexico and Central America.

103. *Palæmon fluviatilis* Streets, l. c., 1871, p. 227, pl. II, f. 5. Isthmus of Tehuantepec.

104. *Palæmon montezumæ* Saussure, l. c., p. 51, pl. IV, f. 28. Vera Cruz, Mexico.

105. *Palæmon heterocheirus* Weigmann, l. c., 1836, p. 149. Fresh water of western Mexico.

#### SUBFAMILY Oplophorinæ.

GENUS OPLOPHORUS *M. Edwards*.

(including *Xiphocaris* von Martens.)

106. *Oplophorus elongata* Kingsley. *Hippolyte elongata* Guérin, in Ramon de Sagra's *Historia física, política, y natural de la isla de Cuba*, 1856, p. xx, pl. II, f. 16 (*teste* Martens). *Oplophorus americanus* Saussure, l. c., 1858, p. 56, pl. IV, f. 31, pl. V, f. 32. *Xiphocaris elon-*



*gata* von Martens, Wiegmann's Archiv für Naturgeschichte, 1872, p. 140.

West Indies.

#### FAMILY PASIPHÆIDÆ.

##### GENUS PASIPHÆA *Savigny*.

107. *Pasiphæa tarda* *Kroyer*, Naturhistorisk Tidsskr., 1844-45, II, 1, p. 453.

Arctic.

108. *Pasiphæa glacialis* *Buchholz*, Zweite Deutsche Nordpolarfahrt, 1874, p. 279, pl. I, f. 2.

70° north latitude.

#### FAMILY PENEIDÆ.

##### GENUS SICYONIA *M. Edw.*

109. *Sicyonia brevirostris* *Stimpson*, Ann. N. Y. Lyc., 1871, x, p. 132. *Sicyonia cristata* *Saussure* (non *De Haan*), l. c., 1858, p. 55, pl. III, f. 25.

Florida, Cuba.

110. *Sicyonia dorsalis* *Kingsley*, Proc. Acad. Nat. Sci., Phila., 1878, p. 97.

Florida.

111. *Sicyonia lævigata* *Stimpson*, Ann. N. Y. Lyc., 1871, x, p. 131. South Carolina.

##### GENUS PENEUS *Latreille*.

112. *Peneus setiferus* *Edw.*, Hist. Nat. des Crust., 1837, ii, p. 414. *Stimpson*, Ann. N. Y. Lyc., 1871, x, 133. *Cancer setiferus* *Linne* (*teste Edw.*). *Peneus fluvialis* *Say*, l. c., 1818, i, p. 236.

Virginia to Texas and Brazil.

113. *Peneus braziliensis* *Latreille*, Nouv. Dict. d'Hist. Nat., t. xxv., p. 154 (*teste Edw.*). *Edw.*, Hist. Nat. des Crust., 1837, ii, p. 414. *Gibbes*, Proc. A. A. A. S., 1851, iii, p. 198. *Stimpson*, Ann. N. Y. Lyc., 1871, x, p. 132.

New York to Brazil.

114. *Peneus brevirostris* *Kingsley*, Proc. Acad. Nat. Sci., Phila., 1878, p. 98.

West coast of Nicaragua.

115. *Peneus pubescens* *Stimpson*, Annals N. Y. Lyc., 1871, x, p. 133.

St. Thomas.

116. *Peneus stylirostris* *Stimpson*, Annals N. Y. Lyc., 1871, x, p. 134.

Panama.

117. *Peneus constrictus* *Stimpson*, Annals N. Y. Lyc., 1871, x, p. 135.

Carolinas.

118. *Peneus occidentalis* *Streets*, Proc. Phila. Acad., 1871, p. 243.

Isthmus of Panama.

#### FAMILY SERGESTIDÆ.

##### GENUS SERGESTES *Edwards*.

119. *Sergestes arctica* *Kroyer*, Monographisk Fremstilling af Kræbsdyrslægten *Sergestes*, 1856, p. 240, pl. III, f. 7, pl. v, f. 16.

Greenland.

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## REGULAR MEETING, MONDAY, MARCH 18, 1878.

MEETING this evening at 7.30 o'clock. The PRESIDENT in the chair. Records and correspondence read and donations announced.

The evening was occupied by Vice President F. W. PUTNAM, who gave an account of his recent

## ARCHÆOLOGICAL EXPLORATIONS IN TENNESSEE.

After a review of what is known of the remains of the prehistoric nations of the southwestern portions of the United States, Mr. Putnam gave a special account of his own work in the vicinity of Nashville, where he had enjoyed special opportunities for field work for a month after the adjournment of the meeting of the American Association for the Advancement of Science in September last.

The first excavations were made near the site of Fort Zollicoffer, a few miles out from Nashville. Here were found many of the ancient stone graves which occur by thousands in various parts of the state, the large cemeteries bearing witness of a numerous people who formerly inhabited that beautiful country.

These stone graves are sometimes isolated, but generally they occur close together and covering large tracts, oftentimes of several acres in extent. Each grave is made by placing slabs of stone, a few inches thick, on edge, forming the four sides of the grave. The bottom of the grave was then lined with stones, and after the body, and various articles deposited with it, had been placed in this stone box, or cist, the whole was covered over by large slabs of stone. Sometimes only one piece of stone was used for a cover, but generally three or four. These graves were of all sizes, from those not much over

a foot square to those about seven feet in length by two feet in width. Occasionally still wider graves were found, and these always contained two bodies; in one case three bodies had been placed in one large grave. Some of the small graves were found to contain the bones of adult persons, but out of natural connection and in such positions as to show that they had been buried after the flesh had decayed. The majority of the small graves were those of children of various ages.

The bones were found in all stages of advanced decay, and it was only by using the greatest care that any could be preserved. About sixty perfect and nearly perfect skulls were obtained, and numerous other bones were secured, though to attain these results many hundred graves were opened in several localities. Often a grave would be uncovered and found to contain a jar or two, or perhaps a few stone implements, etc., with hardly a vestige of the human bones, so perfectly had all that once formed the human body returned to its natural elements.

In a grave at Fort Zollicoffer a very interesting ornament of copper was found, and in three other instances afterwards, at other localities, copper ornaments were obtained.

At Miss Bowlin's farm, about six miles from Nashville, a very interesting series of mounds were explored. These mounds were about five or six feet high by about one hundred to two hundred feet in diameter, and were found to be made entirely of such stone graves as have been described. The graves were of all sizes, and irregularly arranged in from three to five tiers, each mound thus containing several hundred graves. From these grave mounds many very interesting articles were obtained, such as vessels of clay of various shapes and sizes, several of which were ornamented, but the majority were plain

forms of water jars, pots with handles, bowls and dishes, which evidently contained food when placed in the graves. Besides these articles of pottery, several pipes made of the same material were found, and numerous stone imple-



FIG. 1.

ments, shell beads, bone awls, and other useful and ornamental articles used and worn by the departed people were obtained.

In order to illustrate the character of the pottery found

in the stone graves in Tennessee a few cuts, borrowed from the Peabody Museum of Cambridge, are here in-

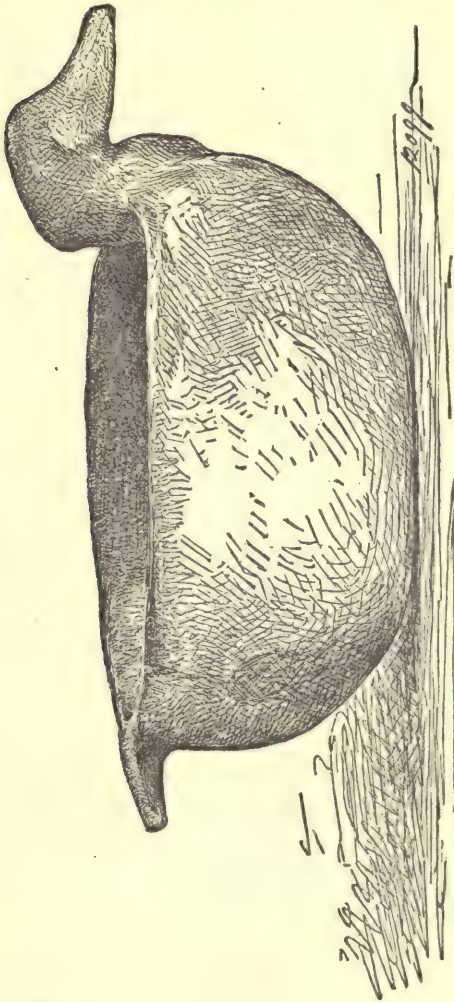


FIG. 2.

serted. In Mr. Putnam's Report, as Curator of the Peabody Museum, many other forms of pottery and various



other articles will be illustrated. The vessels here figured were all taken from the graves within the enclosure at Lebanon, and are represented of one-half their actual diameter (or one-quarter size). Figures 1, 2, 3, represent three vessels found in the grave of a child; figure 4 one found in another child's grave, and figures 5, 6, 7, 8, 9, several of the forms obtained from the graves of adults. This pottery is well made and composed of clay mixed with

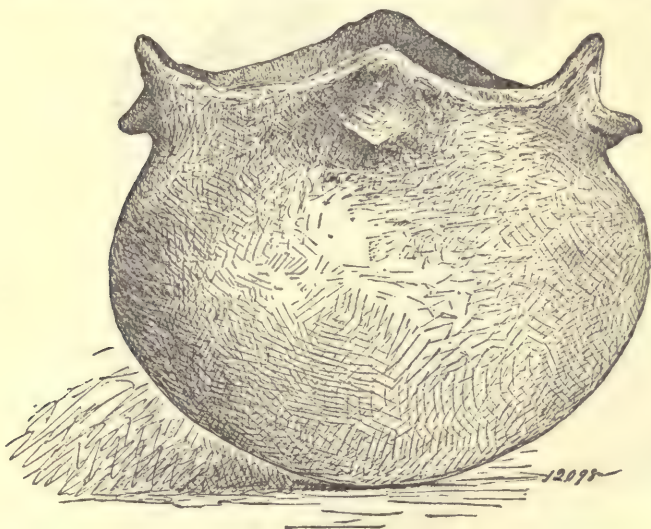


FIG. 3.

pounded shells. All the articles are black except the water jar represented by figure 1, which is of a light yellow color, and when first taken out showed circular lines of dark paint which, as the pigment had not been burnt in, scaled off in drying the jar and can now only be faintly traced.

Another class of prehistoric remains in Tennessee consists of the large earth mounds, two of which Mr. Putnam opened at considerable expense and labor.

One of these, on the old Love estate, several miles

from Nashville, was conical in shape, about twenty-three feet high and one hundred and fifty feet in diameter. Trenches and tunnels were cut through this mound in

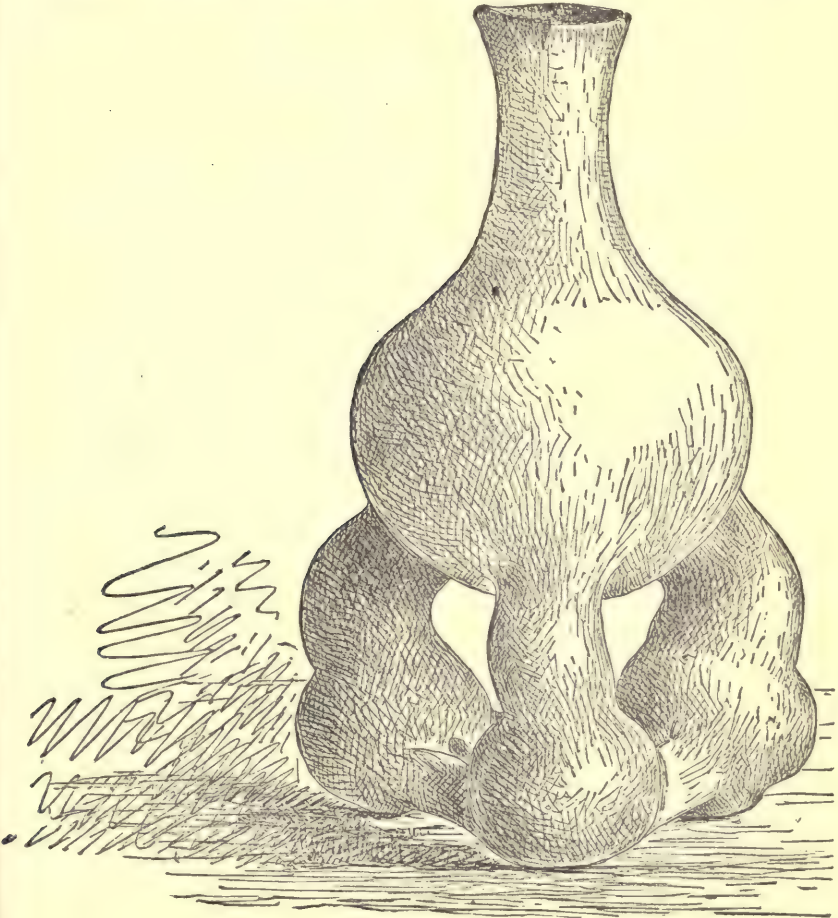


FIG. 4.

several directions and its structure ascertained. This mound did not contain any burial chamber and seemed to

have been erected for some other purpose than as a monument over a distinguished person. The sections made showed that this immense pile of earth had been brought in small quantities, probably from within a few hundred



FIG. 5.

yards of the mound where artificial depressions could be traced. The outline of each little basket load of dirt could be traced, and showed how arduous had been the

labor bestowed upon this earth structure, the particular object of which was undoubtedly of importance to the people who made it, though now it can only be conjectured what that may have been.

After excavating in numerous localities about Nashville with very successful results, Mr. Putnam visited Greenwood Seminary, near Lebanon, Tenn. Here, by the kind

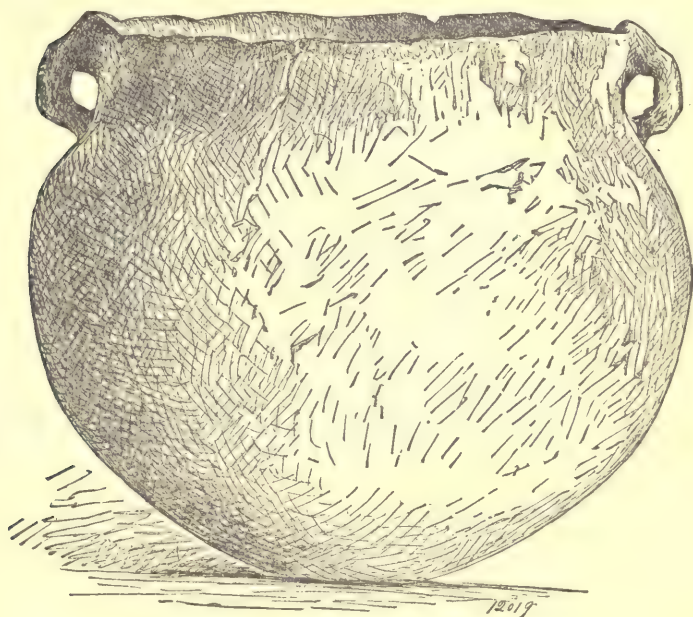


FIG. 6.

attention of Mrs. N. Lawrence Lindsley and other members of her family, he was enabled to make his most important and instructive researches. At this place, on the old Lindsley estate, there exists a very perfect earth-work formed by a wall and trench surrounding an area of nearly twelve acres.

At one place, near Spring creek, there are two cause-



ways over the trench, and about one hundred and fifty feet in front of the causeway are five low mounds upon which, under the covering of sod, evidence of ancient fires were found. Inside the trench and embankment, near the western side, is a large mound, about fifteen feet high, with a flat top which is about seventy by ninety feet in extent. In all directions, from the large mound to the embankment, are numerous low circular mounds, averaging about forty feet in diameter. The central por-

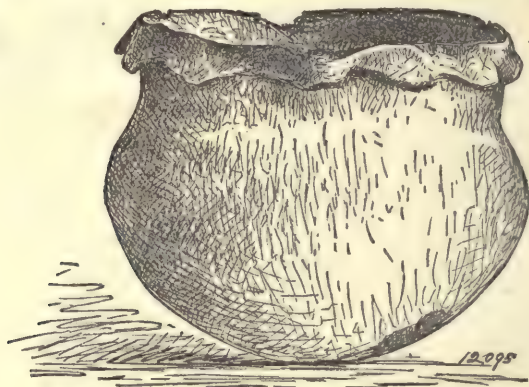


FIG. 7.

tions of these mounds are depressed, indicating the sites of the houses of the people who lived inside of the earth-work.

The large mound was opened by cutting a trench five feet wide on the eastern side, and gradually widening it to fourteen feet, which width was retained well beyond the centre. This trench was carried to a depth of eighteen feet, or four feet below the original surface upon which the mound was erected. At the original surface evidence of an extensive fire was noticed. Among the charcoal and ashes were numerous fragments of bones of animals. A few feet above this ash bed a piece of cedar

about three feet long was found, as if the remains of a stake or post. Seven feet above this ash bed another fire had been made, evidently extending over the top of the mound when at that height. This upper bed of ashes contained burnt corn cobs, burnt animal bones and charred fragments of matting. From this level to the surface nothing of importance was noted, the mound having probably been completed after the extensive fire in the centre.

Thorough examinations of many of the smaller mounds were made, and it was found that in most of them burials had taken place just on the outer edge of the inner de-

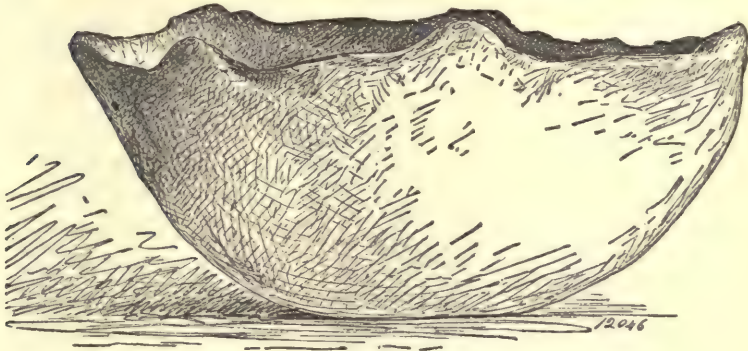


FIG. 8.

pression, in such a manner as to show that these burials were made within the house. In every case it was found that only children had been thus buried. Over many of these graves fires had been made, and the refuse matter in the raised circles consisted of bones of deer, birds and other animals used as food, fragments of pottery and various domestic implements, just such as would naturally be gathered about a house. In the children's graves were found many articles of pottery, shell and bone, beads, pearls, etc. The discovery of several shells peculiar to the Gulf coast, indicates that the inhabitants of this an-

cient village either came from the coast or, what is more probable, had relations with a coast people.



FIG. 3.

On the southeastern side of the great mound a low mound was dug away and found to contain about sixty graves, of youths and adults. In one of these, however, a child was buried with a grown person, and in another grave two bodies had been placed. This mound had the graves about the edge only, in two rows and three deep. These graves were sometimes carefully made with stones, but others were only indicated by side stones, and one of the bodies had been placed in the ground without any stones about it. These graves proved very rich in articles buried with the dead, and furnished interesting

articles of pottery, pipes, stone implements, ornaments of shells, copper ornaments, etc.

Among the pipes found was one cut in stone (Fig. 10), of a very interesting and unique design, representing a man holding a cooking pot in his hands before him, which forms the bowl of the pipe, while the opening for the stem



FIG. 10.

was in his back. In this carving the hair is represented as coiled above and behind the head.

From a grave of a child under the floor of one of the houses three valuable and curious articles of pottery were obtained. One was a very fine water jar (Fig. 1), representing a bear standing on its four legs, with the characteristic head of the animal very well reproduced and the body ornamented by circular colored lines. Another was a dish (Fig. 2) ornamented with a duck's head, and the third was a very pretty bowl (Fig. 3) with deeply scalloped edges.



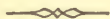
From his researches in Tennessee Mr. Putnam was led to the following conclusions :—

*First.* The people who buried their dead in the singular stone graves of Tennessee, were intimately connected with, or were of the same nation as, those whose dead were buried in the mounds and cemeteries in Illinois, Missouri, and Arkansas, and who made the pottery of which such a large amount has been taken from the burial places in those states. This is shown by the similarity of the crania, by the identity in material, patterns, and finish of the pottery, and by the shell carvings, etc.

*Second.* This nation, known as the Stone Grave people in Tennessee, and the Mound Builders in Missouri, were advanced in the primitive arts, and probably cultivated the land to some extent. Of all the people of America, east of the region of the Pueblo nations of New Mexico, they were the farthest advanced in the ceramic art, and were good workers in and carvers of stone and shell. Judging by their earth-works, they were not so powerful a people as the Mound Builders of the Ohio valley. Judged by their works in pottery, their carvings in shell and their chipped implements of stone, they were as far advanced as their neighbors on the Ohio, while their carvings in stone were hardly equal to the sculptures found in the Ohio mounds. They did not burn their dead, as was undoubtedly the custom to a great extent among the Ohio Mound Builders. They were workers in copper which they must have obtained by trade or by long excursions. They also had shells from the Gulf or southeastern coast, and used them very extensively in the manufacture of beads and ornaments. They also understood the method of perforating pearls, of which six were found in the grave of a child. To their children they were evidently attached, as exemplified by the care with which they were

buried within the house, and the value of the articles placed in the graves with them.

*Third.* The Stone Grave people of Tennessee, judging by the entire absence of articles of European make in the hundreds of graves that have been opened, never came in contact with the white man, and probably were driven out or absorbed by other and more warlike, or larger tribes of their own great race, before his advent on this continent.



#### REGULAR MEETING, MONDAY, APRIL 1, 1878.

MEETING this evening at 7. 30 P. M. VICE-PRESIDENT D. B. HAGAR in the chair. Records read, and correspondence and donations announced.

Messrs. H. H. Edes, of Charlestown and John H. Langmaid, of Salem, were elected resident members.

Mr. JOHN ROBINSON referred to the recent decease of Mr. FRANCIS PUTNAM, an original member of the Institute and for many years an officer. Mr. Robinson said that the Institute was largely indebted to Mr. Putnam for his liberal contributions of flowers at the Horticultural exhibitions, covering a period of more than forty years. He was always one of the largest contributors, and at the exhibition in 1844 he placed more than four hundred varieties of the Rose in the stands. He was the third person in Salem who successfully raised the Night Blooming Cereus, and during the past ten or fifteen years has been interested in the improvement of the Gladiolus and the Amaryllis, and at a recent exhibition of the Massachusetts Horticultural Society he was awarded the silver medal, for new and valuable varieties of the latter flower.

Mr. Robinson moved that the chair should appoint a committee to prepare resolutions of respect to the memory of the deceased. Messrs. Robinson, Wheatland, and Bolles were appointed on said committee.

The paper of the evening was read by Rev. E. C. BOLLES, "On Salisbury and a Day at Stonehenge." It was extremely interesting and instructive. Diagrams and photographs were exhibited.



#### REGULAR MEETING, MONDAY, APRIL 15, 1878.

Vice President Prof. D. B. HAGAR in the chair.

GEORGE D. PHIPPEN, Curator of Botany, occupied the hour with a graphic description of his "Impressions of the Flora of Texas," he having been one of the party of members of the American Association for the Advancement of Science who, after the session at Nashville, Tenn., last fall, participated in the Texas excursion. A full account of the party, route and incidents was given in successive numbers of the "Salem Register" during the past winter.

Mr. Phippen alluded to remarkable trees and plants met with on the route before reaching Texas, such as large trees of the Crape Myrtle at Norfolk, Va., *Magnolia grandiflora* at Nashville, *Nelumbo luteum*, the great water lily of the southern rivers, etc.

He spoke also of the vegetable productions of the south, as corn, cotton, sugar cane, tobacco and sweet potatoes, some of which were seen in the bottom-lands covering fields of great extent.

The vegetation of Texas, as influenced by the changing geological features of the country traversed, was described,

as noticed in the higher lands, the rolling prairie, the timber belts and the immense tracts of level prairie.

The country for the most part is well watered and the timber ridges, which are frequent, are covered with noble pecan trees and other walnuts, also oaks, ashes, elms, cottonwoods, sycamores and mulberry trees.

The undergrowth was generally light, and through arching alcoves the sun-light glistened from the polished leaves, producing an exhilarating effect upon the mind; while other woods, heavily draped and shrouded with hanging masses of the *Tillandsia* or Spanish moss, produced feelings of an opposite nature.

The monotony of the grassy prairies was relieved and varied by a copious sprinkling of the yellow starry blossoms of *Helianthus*, *Leptopoda* and *Helenium*; or blotched and spotted with white masses of *Euphorbia*, *Eupatorium*, and the prickly *Argemone*. Many plants hitherto seen only in cultivation were traced to their native wilds, such as *Argemone*, *Gaura*, *Salvia*, *Eupatorium*, *Bignonia*, etc. This was remarkably manifest when the party alighted from the sleeping car at Fort Worth, on a brilliant Sabbath morning after a thunder storm of the previous night, where they saw the coal-black soil at their feet covered with *Verbenas*, *Salvias*, *Eryngiums*, *Argemones*, *Gauras*, *Solanums*, *Asclepias* and *Cassia*. Here it was that they first met with a strange little *Amarilid*, since ascertained to be *Cooperia Drummondii*.

At Austin, the capital of the state, a drive was taken to Mt. Bonnel where were found novel specimens of trees and shrubs; *Sophora speciosa*, with its hard pods of red, bean-like seeds, *Diospyros Texana*, the wild persimmon, *Prosopis glandulosa*, the mesquite tree; woods and coppices of the latter are known as Chapparel, of which we heard so much during the Mexican War. The increas-



ing growth of the mesquite tree is said to have a marked and beneficial influence upon the climate of the country, inducing more frequent rains and a more nutritious growth of grass under its partial shade.

One of the most common ornamental trees of the cities and towns of Texas is the Pride of India, or the China Umbrella tree, *Melia Azederach*, a tree of exquisite symmetry and appropriate name. The *Sapindus marginatus*, a native of the surrounding forests called wild china tree, somewhat resembles the former and is often cultivated in close proximity with it.

In the neighborhood of San Antonio the vegetable productions were more peculiar and strange; among them were noticed large clumps of *Opuntia leomanchica*, a prickly pear, four to six feet in height, the branches of which consist of leaves as large as dining plates, piled one upon the other edge to edge. Hedges were grown of it, which have the advantage of rising higher and more thorny year by year. At the San Pedro springs, just out of the city were seen plants of a decidedly tropical aspect; covering the surface of the water, and floating upon it, hiding under the shade of trees or skirting the sunburnt rocks with unfamiliar forms.

One of the most common plants of the country was the Texas flax, so called, not a flax at all, but a weed of the Composite order, viz.: *Amphiachyris Drummondii* and *Gutierrezia Texana*, scarcely distinguished from each other, together bear that common name. Another very common plant might be mentioned, as it is sometimes indifferently cultivated in our gardens, *Euphorbia marginata*, seen of all sizes, but often growing to magnificent proportions, and with its striped envelopes waving in the wind, is an object of considerable beauty.

At Galveston, on the Gulf, hedges were made of the

*Tamarix gallica*, called there saltwater cedar, which helped to prevent encroachments of the sea. Oleander trees of great size bordered the streets, and in the gardens there were noticed orange, lemon, fig and banana trees.

As a substantial proof that the trip to Texas was not altogether in vain in a botanical sense, Mr. Phippen said he had the pleasure of presenting to the Herbarium of the Institute in the name of Lester F. Ward, Esq., the chief botanist of the party, the collection of plants in the folios upon the table. These specimens have been carefully elaborated and labelled by Mr. Ward, and they are the result chiefly of his indefatigable exertions, as he was ever on the alert and scarcely did the train momentarily pause at a station or elsewhere upon the road from any cause whatever that sundry plants did not find lodgment in his ample portfolios.

The collection consists of about 370 different species, 92 of which are not found in Mann's Catalogue. About one-fourth of the species were collected before touching the soil of Texas, ten or fifteen in Virginia, near Norfolk, about thirty in the vicinity of Nashville, forty or fifty at Lookout Mountain in Tennessee, a few on the border of Mississippi and in Arkansas.

Three-fourths at least of the species were collected on Texan soil, and represent only the fall plants. The flowers of spring and early summer are undoubtedly far more numerous and beautiful. Inspection of the collection will show that one-fourth of these are Composites, about fifty sedges and grasses, many Legumiads and Euphorbiads. The Labiates, Onagrads, Verbeniads and Solonales are well represented. Among the Apetalous orders are many of the trees of the woods. The Rose, Pink, and Ranunculus tribes have scarce a representative.

The following list is nearly perfect. Those marked

with a (\*) star are not mentioned in Mann's Catalogue, and are not found growing east of the Mississippi.

A full report upon the plants collected and of the botanical department of the excursion may be expected from Mr. Ward hereafter to appear in some form as a collateral to the Nashville meeting of the "American Association for the Advancement of Science."

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| <p> <i>Clematis reticulata</i>, Walt.<br/> <i>Magnolia grandiflora</i>, L.<br/> <i>Cocculus Carolinus</i>, DC.<br/> <i>Nelumbium luteum</i>, Willd.<br/> <i>Argemone Mexicana</i>, L.<br/> <i>Nasturtium sessiliflorum</i>, Nutt.<br/> <i>Arabis hesperidoides</i>, Gray.<br/> <i>Cleome pungens</i>, Willd.<br/> <i>Ascyrum Crux-Andree</i>, L.<br/>         "    <i>stans</i>, Michx.<br/> <i>Hypericum angulosum</i>, Michx.<br/>         "    <i>aureum</i>, Bartram.<br/>       * <i>Tamarix Gallica</i>, L.<br/> <i>Silene stellata</i>, Ait.<sup>1</sup><br/> <i>Anychia dichotoma</i>, Michx.<br/> <i>Paronychia dichotoma</i>, Nutt.<br/>       * "    <i>setacea</i>, Gray.<br/> <i>Sesuvium Portulacastrum</i>, L.<br/>       * <i>Talinum parviflorum</i>, Nutt.<br/> <i>Malvastrum angustum</i>, Gray.<br/>       * <i>Malvaviscus Drummondii</i>, T. &amp; G.<br/>       * <i>Gossypium herbaceum</i>, L.<br/> <i>Zanthoxylum Carolinianum</i>, Lam.<br/>       * <i>Rhus copallina</i>, L.<br/>         <i>var. lanceolata</i>, Gray.<br/>       * <i>Vitis candicans</i>, Eng.<br/>         "    <i>vulpina</i>, L.<br/>         "    <i>indivisa</i>, Willd.<br/>         "    <i>bipinnata</i>, Torr. &amp; Gray.<br/> <i>Frangula Caroliniana</i>, Gray.<br/>       * <i>Colubrina Texensis</i>, Gray.<br/> <i>Sapindus marginatus</i>, Willd.<br/> <i>Cardiospermum Halicacabum</i>, L.<br/> <i>Polygala lutea</i>, L.<br/>       * <i>Psoralea linearifolia</i>, T. &amp; G.<br/>       * <i>Eysenhardtia amorphoides</i>, H.<br/>         B. K.<br/>       * <i>Petalostemon multiflorum</i>, Nutt.<br/> <i>Amorpha fruticosa</i>, L.<br/> <i>Indigofera leptosepala</i>, Nutt.<br/>       * <i>Daubentonia longifolia</i>, DC.<br/> <i>Glottidium Floridanum</i>, DC.<br/> <i>Stylosanthes elatior</i>, Swartz.<br/> <i>Desmodium lævigatum</i>, DC.         </p> | <p> <i>Desmodium paniculatum</i>, DC.<br/>         "    <i>pauciflorum</i>, DC.<br/>         "    <i>sessilifolium</i>, T. &amp; G.<br/>         "    <i>strictum</i>, DC.<br/>         "    <i>viridiflorum</i>, Beck.<br/> <i>Lespedeza procumbens</i>, Michx.<br/>         "    <i>repens</i>, Torr. &amp; Gray.<br/>         "    <i>violacea</i>, Pers.<br/>         "    <i>Stuevei</i>, Nutt.<br/>         "    <i>striata</i>, Hook. &amp; Arn.<sup>1</sup><br/>         "    <i>hirta</i>, Ell.<sup>1</sup><br/> <i>Phaseolus diversifolius</i>, Pers.<sup>1</sup><br/>         "    <i>helvolus</i>, L.<br/> <i>Centrosema Virginianum</i>, Benth.<br/>       * <i>Sophora speciosa</i>, Benth.<br/>       * <i>Cercis occidentalis</i>, Torr.<br/> <i>Cassia occidentalis</i>, L.<br/>         "    <i>obtusifolia</i>, L.<br/>       * "    <i>Roemeriana</i>, Scheele.<br/>         "    <i>Chamaecrista</i>, L.<br/>         "    <i>nictitans</i>, L.<sup>1</sup><br/>       * <i>Parkinsonia acauleata</i>, L.<br/>       * <i>Prosopis glandulosa</i>, Torr.<br/>       * <i>Acacia Farnesiana</i>, Willd.<br/> <i>Gleditschia triacanthos</i>, L.<br/> <i>Mimosa strigillosa</i>, Torr. &amp; Gray.<br/> <i>Neptunia lutea</i>, Benth.<br/>       * <i>Prunus rivularis</i>, Scheele.<br/> <i>Gillenia stipulacea</i>, Nutt.<br/>       * <i>Rosa foliolosa</i>, Nutt.<br/> <i>Crataegus arborescens</i>, Ell.<br/> <i>Hydrangea radiata</i>, Walt.<br/> <i>Philadelphus hirsutus</i>, Nutt.<br/> <i>Heuchera villosa</i>, Michx.<br/> <i>Sedum pulchellum</i>, Michx.<br/>         "    <i>Nevii</i>, Gray.<br/>       * <i>Gaura longiflora</i>, Spach.<br/>       * <i>Stenosiphon virgatus</i>, Spach.<br/> <i>Oenothera sinuata</i>, L.<br/>       * "    <i>Drummondii</i>, Hook.<br/> <i>Jussiaea repens</i>, L.<br/>       * <i>Lagerstromia Indica</i>, L.<br/> <i>Ammannia latifolia</i>, L.<br/>       * <i>Opuntia leomanchica</i>, Eng.         </p> |
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- \* *Papaya vulgaris*, DC.  
*Passiflora incarnata*, L.<sup>1</sup>  
*Bryonia Boykinii*, Torr. & Gray.  
*Hydrocotyle interrupta*, Muhl.  
*Eryngium yuccæfolium*, Michx.  
 \* " *Leavenworthii*, T. & G.  
*Thaspium trifoliatum*, Gray.  
 \* *Cornus Drummondii*, C. A. Meyer.  
*Symphoricarpos vulgaris*, Michx.  
*Viburnum prunifolium*, L. var.  
*Spermacoce glabra*, Michx.  
*Diodia Virginica*, L.  
 \* *Gardenia florida*, L.  
*Houstonia purpurea* L.  
*Vernonia fasciculata*, Michx., var.  
*altissima*, Torr. & Gray.  
*Vernonia angustifolia*, Michx.  
 \* " *Lindheimeri*, Eng. & Gr.  
*Elephantopus tomentosus*, L.  
*Liatris elegans*, Willd.  
 " *scariosa*, Willd.  
 \* " *mucronata*, DC.  
*Kuhnia eupatorioides*, L.  
*Eupatorium album*, L.  
 " *altissimum*, L.  
 " *aromaticum*, L.<sup>1</sup>  
 " *incarnatum*, L.  
 " *parviflorum*, Ell.  
 " *serotinum*, Michx.  
*Aster cordifolius*, L.  
 " *divaricatus*, Nutt.  
 " *lævis* L.  
 " *paludosus*, Ait.  
 " *patens*, Ait.  
*Erigeron strigosus*, Muhl.  
 \* " *scaposum*, DC.  
 \* *Aphanostephus Arkansanus*, Gray.  
*Diplopappus cornifolius*, Darl.<sup>1</sup>  
*Boltonia diffusa*, L'Her.  
 \* *Amphlachyris dracunculoides*, DC.  
 \* *Gutierrezia Texana*, T. & G.  
*Brachychæta cordata*, T. & G.  
*Solidago gigantea*, Ait.  
 " *lanceolata*, L.  
 " *nemoralis*, Ait.  
 " *odora*, Ait.  
 " *petiolaris*, Ait.  
 " *Radula*, Nutt.  
 " *rigida*, L.  
 " *rupestris*, Raf.  
 " *serotina*, Ait.  
 " *speciosa*, Nutt.  
 " *tortifolia*, Ell.  
 " *ulmifolia*, Muhl.<sup>1</sup>
- \* *Solidago leptoccephala*, T. & G.  
 \* " *speciosa*, Nutt., var.  
*angusta*, Gray.  
 \* *Grindelia squarrosa*, Dunal.  
 \* *Aplopappus phyllocephalus*, DC.  
*Isopappus divaricatus*, T. & G.  
*Heterotheca scabra*, DC.  
*Chrysopsis graminifolia*, Nutt.  
 " *Mariana*, Nutt.<sup>1</sup>  
 \* " *pilosa*, Nutt.  
*Pluchea bifrons*, DC.  
 " *fœtida*, DC.  
 " *camphorata*, DC.  
*Silphium compositum*, Michx.  
*Berlandiera tomentosa*, var.  
*dealbata*, T. & G.  
 \* *Melampodium cinereum*, DC.  
*Parthenium Hysterophorus*, L.  
*Iva frutescens*, L.  
 " *ciliata*, Willd.  
 " *microcephala*, Nutt.  
*Ambrosia bidentata*, Michx.  
 " *psilostachya*, DC.  
*Xanthium strumarium*, L.,  
 var. *echinatum*, Gray.  
*Borrchia frutescens*, DC.  
*Rudbeckia triloba*, L.  
 " *nitida*, Nutt.  
*Lepachys pinnata*, Torr. & Gray.  
 \* " *columnaris*, Gray.  
 var. *pulcherrima*, Don.  
*Helianthus angustifolius*, L.  
 " *doronicoides*, Lam.  
 " *microcephalus*, T. & G.  
 " *occidentalis*, Riddell,  
 var. *plantaginifolius*, T. & G.  
 \* *Helianthus Maximiliani*, Schrad.  
 \* " *lenticularis*, Dougl.  
*Coreopsis aristosa*, Michx.  
 " *senifolia*, Michx.  
 var. *stellata*, T. & G.  
 \* *Thelesperma subsimplicifolium*, Gray.  
 \* *Thelesperma filifolium*, Gray.  
*Spilanthes Nuttallii*, T. & G.  
 \* *Ximenesia enceloides*, Cav.  
*Verbesina Virginica*, L.  
*Gaillardia lanceolata*, Michx.  
 \* " *pulchella*, Foug.  
 \* *Palafoxia callosa*, T. & G.  
*Helenium tenuifolium*, Nutt.  
 " *microcephalum*, DC.  
*Leptopoda brachypoda*, T. & G.  
*Artemisia vulgaris*, L.  
*Gnaphalium polycephalum*, Michx.



- \**Centaurea Americana*, Nutt.  
*Hieracium Gronovii*, L.  
     "    *venosum*, L.  
*Lobelia cardinalis*, L.  
     "    *puberula*, Michx.  
*Campanula divaricata*, Michx, var.  
*Epigaea repens*, L.  
*Oxydendrum arboreum*, DC.  
*Clethra alnifolia*, L.  
*Ilex decidua*, Walt.  
 \**Diospyros Texana*, Scheele.  
*Bumelia lanuginosa*, Pers.  
*Statice Limonia*, L.  
     var. *Caroliniana*, Gr.  
*Samolus Valerandi*, L.  
     var. *Americanus*, Gray.  
*Martynia proboscidea*, Glox.  
 \**Penstemon Cobæa*, Nutt. ?  
*Conobea multifida*, Benth.  
*Herpestis Monniera*, H. B. K.  
     "    *negrescens*, Benth.  
*Gerardia purpurea*, L.  
     "    *aspera*, Dougl.  
     "    *quercifolia* Pursh.  
     "    *grandiflora*, Benth, var.  
*Ruellia ciliolos*, Nees.  
     "    *strepens*, Nees.  
 \*    "    *tuberosa*, L.  
*Dicliptera brachiata*, Spreng.  
*Verbena officinalis*, L.  
     "    *bracteosa*, Michx.  
     "    *Aubletia*, L.  
 \*    "    *luceana*, Walp.  
*Lippia nodiflora*, Michx.  
*Callicarpa Americana*, L.  
*Trichostema dichotomum*, L.  
*Isanthus cæruleus*, Michx.  
 \**Pycnanthemum albescens*, T. & G.  
 \**Hedeoma Drummondii*, Benth.  
     "    *pulegioides*, Pers.<sup>1</sup>  
*Salvia azurea*, Lam.  
 \**Scutellaria Drummondii*, Benth.  
*Heliotropium Europæum*, L.  
*Heliotropium Curassavicum*, L.  
     "    *tenellum*, Torr.  
*Heliohyptum Indicum*, DC.  
*Onosmodium molle*, Michx.  
 \**Hydrolea ovata*, Nutt.  
*Phlox glaberrima*, L.  
*Gilia coronopifolia*, Pers.  
*Ipomœa commutata*, R. & S.  
*Cuscuta inflexa*, Engelm.  
 \**Solanum Texanum*, DC.  
 \*    "    *Elæagnifolium*, Cav.  
 \*    "    *Lindheimerianum*, Sch.  
 \*    "    *rostratum*, Dunal.  
*Physalis angulata*, L.  
     "    *Pennsylvanica*, L.  
         var. *lanceolata*, Gray.  
*Nicandra physaloides*, Gærtn.  
*Lycium Carolinianum*, Michx.  
*Sabbatia calycosa*, Pursh.  
 \**Eustoma Russellianum*, Don.  
*Polypremum procumbens*, L.  
*Spigelia Marilandica*, L.  
 \**Nerium Oleander*, L.  
 \**Asclepias longicornu*, Benth.  
 \**Asclepiodora viridis*, Gray.  
*Enslenia albida*, Nutt.  
*Gonolobus lævis*, Michx.  
 \*    "    *biflorus*, Nutt.  
*Fraxinus Americana*, L.  
*Forestiera ligustrina*, Poir.  
     "    *acuminata*, Poir.  
*Asarum arifolium*, Michx.  
 \**Mirabilis jalapa*, L.  
 \**Oxybaphus hirsutus*, Sweet.  
 \**Rivina lævis*, L.  
*Atriplex arenaria*, Nutt.  
*Salicornia mucronata*, Big.,  
     var. *suffrutescens*, Watson.  
*Amarantus albus*, L.  
*Montelia mariscina*, Gray.  
*Iresine celosioides*, L.  
 \**Alternanthera lanuginosa*, Torr.  
*Polygonum aviculare*, L.  
     "    *Pennsylvanicum*, L.  
     "    *setaceum*, Baldwin.  
     "    *tenue*, Michx.  
*Eriogonum longifolium*, Nutt.  
*Persea Carolinensis*, Nees.  
*Euphorbia corollata*, L.  
     "    *dentata*, Michx.  
     "    *glyptosperma*, Engelm.  
     "    *marginata*, Pursh.  
     "    *serpens*, H. B. K.  
 \*    "    *zygophylloides*, Boiss.  
 \*    "    *prostrata*, Ait.  
*Stillingia sylvatica*, L.,  
     var. *linariæfolia*, J. Müll.  
*Acalypha Virginica*, L.  
     var. *gracilens*, Gray.  
*Acalypha Caroliniana*, Walt.  
*Tragia urticæfolia*, Michx.  
*Croton maritimus*, Walt.  
 \*    "    *muricatus*, Nutt.  
     "    *glandulosus*, L.  
     "    *capitatus*, Michx.  
     "    *monanthogynus*, Michx.  
 \**Argyrothamnia humilis*, J. Müll.  
 \**Phyllanthus polygonoides*, Spg.  
*Batis maritima*, L.

- Ulmus alata*, Michx.  
 \* " *crassifolia*, Nutt.  
 \* *Celtis pallida*, Torr.  
*Parietaria Pennsylvanica*, Muhl.  
*Juglans nigra*, L.  
*Carya tomentosa*, Nutt.  
*Quercus aquatica*, Catesby.  
 " *macrocarpa*, Michx.  
 " *palustris*, Du Roi.  
 " *Prinus*, L.  
 var. *acuminata*, Michx.  
*Castanea pumila*, Michx.  
*Populus monilifera*, Ait.  
 " *angulata*, Ait.  
*Pinus Taeda*, L.  
*Taxodium distichum*, Richard.  
*Juniperus Virginiana*, L.  
 \* " *occidentalis*, Hook.,  
 var. *conjungens*, Eng.  
*Lemna minor*, L.  
*Spiranthes simplex*, Gray.  
 \* *Cooperia Drummondii*, Herb.  
*Agave Virginica*, L.  
*Tillandsia recurvata*, Pursh.  
 " *usneoides*, L.  
*Sisyrinchium Bermudiana*, L.  
*Smilax tamnoides*, L.  
 " *Pseudo-China*, L.  
*Allium striatum*, Jacq.  
 \* *Yucca rupicola*, Scheele.  
*Commelina Virginica*, L.  
*Cyperus diandrus*, Torr.  
 " *filiculmis*, Vahl.  
 " *inflexus*, Muhl.  
 " *microdontus*, Torr.  
 " *rotundus*, L., var. *Hydra*,  
 Gray.  
 " *strigosus*, L.  
 \* " *litos*, Schult.  
 \* *Kyllingia pumila*, Michx.
- Fimbristylis capillaris*, Gray.  
*Rhynchospora inexpansa*, Vahl.  
*Carex verrucosa*, Ell.  
*Vilfa aspera*, Beauv.  
 " *vaginæflora*, Torr.  
 " *Virginica*, Beauv.  
*Sporobolus Indicus*, Brown.  
*Muhlenbergia capillaris*, Kunth.  
*Aristida purpurascens*, Poir.  
 \* " *purpurea*, Nutt.  
*Spartina gracilis*, Hook.  
 \* *Buchloë dactyloides*, Eng.  
*Bouteloua hirsuta*, Lagasca.  
 " *curtipendula*, Gray.  
*Gymnopogon racemosus*, Beauv.  
 \* *Chloris verticillata*, Nutt.  
*Cynodon Dactylon*, Pers.  
*Leptochloa mucronata*, Kunth.  
*Tricuspis ambigua*, Chapm.  
 \* " *albescens*, Munro.  
*Brizopyrum spicatum*, Hook.  
*Eragrostis Frankii*, Meyer.  
 " *Purshii*, Schrad.  
 \* " *pilifera*, Scheele.  
 \* " *interrupta*, Nutt.  
 \* " *capitata*, Nutt.  
 \* " *oxylepis*, Torr.  
*Paspalum læve*, Michx.  
*Panicum obtusum*, H. B. K.  
 \* *Panicum Crus-galli*, L.  
*Cenchrus tribuloides*, L.  
*Andropogon furcatus*, Muhl.  
 " *scoparius*, Michx.  
 " *argenteus*, Ell.  
*Sorghum nutans*, Gray.  
 \* *Sorghum vulgare*, L.  
*Monanthochloë littoralis*, Engelm.  
*Pellæa atropurpurea*, Link.  
*Woodsia obtusa*, Torrey.

† Twelve of the Lookout Mt. plants, not reviewed by Mr. Ward.

## ANNUAL MEETING, MONDAY, MAY 20, 1878.

MEETING this evening at 7.30. The PRESIDENT in the chair. Records read. The annual reports of the Secretary, Treasurer, Librarian, Curators and Standing

Committees were read and accepted, and from them the accompanying

#### RETROSPECT OF THE YEAR

has been compiled, presenting the work of the Institute, in the various departments, since the last annual meeting.

**MEMBERS.**—Changes occur in the list of our associates by the addition of new names and the withdrawal of some by resignation, removal from the county or vicinity, or by death. Nineteen resident members have died, and we have received information that two of our correspondents have passed away in a serene old age.

*Jonathan Tucker*, for many years one of the assessors of Salem, son of Andrew and Martha (Mansfield) Tucker, born at Salem, Feb. 1, 1799, died July 31, 1877.

*Benjamin A. West*, a merchant of Salem, son of George and Deborah (Ayers) West, died at Pleasantville, N. Y., Aug. 3, 1877, aged 57 years, 4 months and 5 days.

*Jairus Ware Perry*, a lawyer of Salem, son of Joshua and Ursula (Whight) Perry, born at Raymond, Me., died at Salem, Aug. 27, 1877, aged 55 years, 8 months and 9 days.

*William Graves*, of Newburyport, sea captain and merchant, died Sept. 1, 1877, aged 66.

*Thomas Pinnock*, of Salem, slater, born in England, son of Thomas and Sarah (Nenth) Pinnock, died at Salem, Oct. 21, 1877, aged 60.

*Joshua Cleaves*, in early life, clerk, son of Nathaniel and Teresa (Gott) Cleaves, born in Salem, died at Boston, Sept. 21, 1877, aged 68. His parents were natives of Beverly.

*Fenton Watson*, of Salem, saddler, born in Danvers, .

Feb. 12, 1802, son of Nathaniel and Mary (Symonds) Watson, died at Salem, Nov. 1, 1877.

*John Clarke Lee*, of Salem, banker, son of Nathaniel C. and Mary Ann (Cabot) Lee, born at Boston, April 9, 1804, died at Salem, Nov. 19, 1877.

*William Wallis*, of Salem, trader and clerk, born Mar. 5, 1801, son of Moses and Hannah (Appleton) Wallis, died Nov. 8, 1877.

*Temple Hardy*, of Salem, sash and blind maker, born March 9, 1815, son of Temple and Sally (Chapple) Hardy, died Nov. 25, 1877.

*John Mangan*, of Salem, contractor, born in Ireland, 1832, son of John and Mary (Keefe) Mangan, died Dec. 6, 1877.

*Jonathan C. Perkins*, counsellor at law, Salem, born at Essex, Nov. 29, 1809, son of Ezra and Mary (Peabody) Perkins, died Dec. 12, 1877.

*James Gedney King*, Salem, civil engineer, born Aug., 1852, son of James B. and Mary Jane (Fabens) King, died Jan. 9, 1878.

*Manuel Fenollosa*, of Salem, music teacher, born at Malaga, Spain, Dec. 24, 1822; son of Manuel and Isabel (Del Pino) Fenollosa, died Jan. 13, 1878.

*William Kimball*, Salem, hatter, born in Ipswich, Dec. 1, 1795, son of Thomas and Nancy (Gage) Kimball, died Jan. 19, 1878.

*Thomas Picket*, of Beverly, born at Beverly, Sept. 9, 1805, son of Thomas and Annis (Preston) Picket, died March 23, 1878.

*Francis Putnam*, of Salem, florist, born at Salem, Jan., 1808, son of Ebenezer and Anna (Fiske) Putnam, died March 26, 1878.

*Allen Washington Dodge*, of Hamilton, Treasurer of Essex County, born at Newburyport, April, 1804, died at Hamilton, May 17, 1878.



*Samuel Day*, of Salem, born at Ipswich, March 30, 1798, died at Salem, Sunday, May 19, 1878.

*Jared Potter Kirtland*, M. D., son of Turhand and Mary (Potter) Kirtland, born at Wallingford, Conn., Nov. 10, 1793, died at his residence in East Rochfort (near Cleveland), Ohio, Dec. 10, 1877; a distinguished naturalist.

*Charles Pickering*, M. D., son of Timothy and Lurena (Cole) Pickering, born at Starucca, Wayne Co., Penn., Nov. 10, 1805, died at Boston, Sunday, March 17, 1878.

**MEETINGS.**—During the summer, four *Field Meetings* were held. *First*, at Boxford, June 26, where the objects of the meeting were discussed by the President, Messrs. W. P. Upham, E. C. Bolles, John Robinson, W. S. Coggin, Ancil Dorman, J. H. Emerton, G. A. Perkins, F. Israel, Mrs. C. H. Dall and Mrs. Mary S. Blake. *Second*, at Lanesville, Wednesday, July 18, Messrs. James H. Emerton, Charles H. Sargent, F. Israel, Byron G. Russell, Granville P. Putnam, E. Hitchcock and D. P. Hagar made remarks. *Third*, Wednesday, Aug. 8, at Asbury Grove, Hamilton. The speakers were James H. Emerton, J. P. Magee, George H. Dixon, G. D. Phippen, E. C. Bolles, A. W. Dodge, J. F. Almy, George A. Perkins. *Fourth*, at Marblehead Neck. J. H. Emerton, G. H. Dixon, A. B. Hervey, J. J. H. Gregory, Joseph Banvard, William D. Northend took part in the exercises of the meeting.

*Regular Meetings*, twenty-one, usually on the first and third Monday evenings of each month. The following communications received and lectures delivered may be specified:—"An examination of Types of some recently described Crustacea," by T. Hale Streets and E. S. Kingsley; "Additions to the Ferns of Essex County," by

John Robinson; "On the Exploration of the Merrimack River, in 1638, by order of the General Court of Massachusetts, with a plan of the same," by James Kimball; "Contributions to the Myology of *Tachyglossa Hystrix*, *Echidna Hystrix Auct.*," by J. W. Fewkes; "An Account of a recent visit to Japan," by E. S. Morse; "Remarks on Liberia, particularly of the region about Cape Palmas," by George A. Perkins; "A List of the Birds of Massachusetts, with Annotations," by J. A. Allen; "Archæological Explorations in Tennessee," by F. W. Putnam; "On Salisbury and a day at Stonehenge," by E. C. Bolles; "On the Flora of Texas," by George D. Phippen.

LECTURES AND CONCERTS.—A course of seven lectures under the direction of the Lecture Committee were as follows: 1st, Monday, Oct. 29, 1877, W. F. Bick, on "India." 2d, Monday, Nov. 19, 1877, C. C. Carpenter, on "The Moon." 3d, Monday, Dec. 17, 1877, Charles S. Minot, on "The Scientific problem of Human Life." 4th, Monday, Jan. 21, 1878, Edward S. Morse, on "Japan." 5th, Monday, Feb. 25, 1878, Leonard Waldo, "Mean Time." 6th, Monday, March 11, 1878, Henry Carmichael, on "Waves," 7th, Monday, March 25, 1878, Isaac S. Osburn, on "Faraday and his works."

Under the personal direction of the curator on Music, five concerts have been given with much credit to the society as musical performances. 1st, Monday Nov. 18, 1877, Miss Lilian Bayley and the Schubert Quartette. 2d, Monday, Nov. 28, 1877, Wm. H. Sherwood and Miss Fanny Kellogg. 3d, Dec. 10, 1877, Miss Ita Welsh, Mrs. G. A. Adams, Mr. William F. Winch, D. C. C. Bullard. 4th, Monday, Jan. 14, 1878, Mrs. John Weston, Mr. Wulf Fries, Mr. H. G. Tucker, Mr. J. Phippen, jr. 5th, Monday, Jan. 28, 1878, Mrs. E. Kemble,

Mrs. George Upton, Mr. C. N. Allen, Mr. G. W. Sumner.

*In the Art Department* an increased interest is noticeable. Valuable and instructive volumes relating to the various branches of art are being deposited in the library by the kindness of the curator of Painting and Sculpture, and the books are constantly referred to and consulted by those interested in this direction.

MUSEUM.—The specimens in Natural History, including those in Ethnology and Archæology, which have been given during the year, are on deposit with the trustees of the Peabody Academy of Science, in accordance with previous arrangements. These have been reported at our meetings, and have been duly acknowledged to the several donors. The following may be specified: George H. Allen, C. H. Stocker, George D. Glover, James M. Caller, Miss H. K. Bayley, Alfred S. Peabody. In addition to the above, several interesting specimens of an historical character have been arranged in the rooms. The following are contributors: John L. Robinson of Lynn; Mary E. Briggs, James Emerton, K. E. Nourse, Henry Bridges, W. P. Upham, H. G. King, William B. Parker, Charles S. Buffum, George Perkins, George A. Perkins, Mrs. J. E. A. Todd, F. W. Lee of Beverly, Mrs. N. D. Cole, F. H. Lee, estate of Jonathan Tucker, John Robinson, Richard C. Manning, William G. Barton, Raymond L. Newcomb, Mrs. Anna Warren of Boston. The ordinary routine work has steadily progressed. A room is being prepared in the basement for the arrangement of some of the larger specimens of historical relics, and for the deposit of duplicates, many of which are becoming valuable.

**LIBRARY.**—The additions to the Library during the year now closed have been as follows :

*By Donation.*

Folios, . . . . .	51		
Quartos, . . . . .	34		
Octavos, . . . . .	763	Pamphlets and Serials, . .	3,872
Duodecimos, . . . . .	139	Bound volumes, . . . . .	1,027
Sexdecimos, . . . . .	40		
	—	Total of Donations, . . . .	4,899
Total of bound volumes, . . .	1,027		

*By Exchange.*

Quartos, . . . . .	3	Pamphlets and Serials, . .	2,096
Octavos, . . . . .	107	Bound volumes, . . . . .	113
Duodecimos, . . . . .	3		
	—	Total of Exchanges, . . . .	2,209
Total of bound volumes, . . .	113		

*By Purchase.*

Quartos, . . . . .	1	Pamphlets, . . . . .	61
Octavos, . . . . .	63	Bound volumes, . . . . .	72
Duodecimos, . . . . .	4		
	—	Total of Purchases, . . . .	133
Total of bound volumes, . . .	72		

Total of Donations, . . . . .	4,899
“ of Exchanges, . . . . .	2,209
“ by Purchase, . . . . .	133
Total of Additions, . . . . .	7,241

Of the total number of pamphlets and serials, 4,411 were pamphlets, and 1,618 were serials.

The donations to the Library for the year have been received from one hundred and forty-nine individuals and thirty-three societies and departments of the General and State Governments. The exchanges from one hundred and thirteen societies and incorporate institutions, of which sixty-seven are foreign; also from editors and publishers.



Donations or exchanges have been received from the following:—

	Vols.	Pam.
Allen, Miss M., . . . . .	22	
Allen, Miss Mary P., . . . . .	1	
American Association Advancement of Science, . . . . .	1	
American Gynecological Society, . . . . .	1	
American Unitarian Association, . . . . .	1	
Amherst (Mass.) College, . . . . .		1
Amsterdam, Koninklijk Zoologisch Genootschap "Natura Artis Magistra," . . . . .		4
Andover (Mass.) Memorial Hall Library, . . . . .	1	2
Andover (Mass.) Theological Seminary, . . . . .		1
Appalachian Mountain Club, . . . . .		1
Argentine Republic Commission, . . . . .	1	
Augsburg, Natur historischer Verein, . . . . .		1
Baltimore, Peabody Institute, . . . . .		1
Bamberg, Natur forschende Gesellschaft, . . . . .	1	
Bancroft, C. F. P., . . . . .		4
Barton, W. G., . . . . .		5
Beaman, Rev. C. C., . . . . .		1
Bell, Mrs., Lowell, Mass., . . . . .		1
Bergen Museum, . . . . .		2
Berlin, Deutschen geologischen Gesellschaft, . . . . .		1
Berlin, Gesammten Naturwissenschaften, . . . . .	2	
Berlin, Gesellschaft Naturforschender Freunde, . . . . .	1	
Berlin, Verein zur Beförderung des Gartenbauer, . . . . .		12
Bern, Naturforschende Gesellschaft, . . . . .		1
Berwickshire Naturalist Club, . . . . .	1	
Boardman, S. L., Augusta, Me., . . . . . Newspapers,	3	5
Bolles, E. C., . . . . .	15	122
Boon, E. P., New York, N. Y., . . . . .		180
Bordeaux, Société Linnéenne, . . . . .		3
Boston, American Academy Arts and Science, . . . . .		1
Boston, City of, . . . . .	6	
Boston, City Hospital, . . . . .	1	
Boston, Massachusetts Institute of Technology, . . . . .		2
Boston, Public Library, . . . . .	3	678
Boston Society of Natural History, . . . . .		13
Braunschweig, Archiv der Anthropologie, . . . . .		2
Bremen, Naturwissenschaftlichen Vereine, . . . . .		1
Bristol Naturalists' Society, . . . . .		2
Britten, E. H., . . . . .	1	

	Vols.	Pam.
Brooks, C. T., Newport, R. I., . . . . .	4	3
Brooks, H. M., . . . . .	1	2
Brown, Horace, . . . . .	12	16
Browne, A. G., . . . . .	1	22
Brünn, Naturforschender Verein, . . . . .	1	
Bruxelles Société Entomologique, . . . . .		8
Bruxelles Société Malacologique, . . . . .	1	6
Buffalo Young Men's Association, . . . . .		2
Bunker Hill Monument Association, . . . . .	2	
Caldwell, S. L., . . . . .		1
California, University of, . . . . .		1
Cambridge, Museum of Comparative Zoology, . . . . .		1
Canada, Geological Survey, . . . . .	1	
Canadian Institute, . . . . .		5
Carpenter, C. C., South Peabody, Mass., . . . . . Programmes,		7
Chamberlain, Jas. A., . . . . . Programmes,		5
Chandler, G. L., . . . . .	3	19
Chandler, H. P., . . . . .	1	
Chase, C. H., . . . . .	4	
Cherbourg, Société Nationale Sciences Naturelles, . . . . .		1
Chicago Historical Society, . . . . .		1
Chicago Academy of Science, . . . . .		1
Childs, G. W., . . . . .		1
Christiania, Königl. Norwegischen Universität, . . . . .		10
Cleveland, N., Estate of, . . . . .	8	53
Cleveland, O., Western Reserve and Northern Ohio His- torical Society, . . . . .	1	
Colby University, Waterville, Me., . . . . .		2
Cole, Miss C. J., . . . . .		8
Cole, Mrs. N. D., . . . . . Newspapers,	29	31
Conklin, W. A., . . . . .		2
Conrad, D., . . . . . Newspapers,		
Cooke, C., . . . . .		6
Cowley, C., . . . . .	1	1
Crosby, Mrs. M. K., . . . . . Newspapers,	1	
Croswell, Gov., . . . . .	1	
Cutter, F. E., Newburyport, Mass., . . . . .		4
Danzig, Naturforschende Gesellschaft, . . . . .		1
Darmstadt, Verein für Erdkunde, . . . . .		1
Davenport Iowa Academy of Natural Science, . . . . .		1
David, F., . . . . . Newspapers,		
Delaware Historical Society, . . . . .	2	14
Derby, Miss C. R., . . . . .	1	

	Vois.	Pam.
Devereux, Geo. H., . . . . .	4	1
Dorchester, Mass., First Parish, . . . . .	1	
Drake, E. L., . . . . .		1
Dresden, Naturwissenschaftliche Gesellschaft "Isis," . . . . .		4
Dresden, Verein für Erdkunde, . . . . .	1	
Ébell Society, . . . . .		1
Eddy, Miss H., . . . . .		1
Emdem, Naturforschende Gesellschaft, . . . . .		1
Emmerton, Mrs. E., }	61	165
Mrs. Joseph Osgood, }		
Emmerton, J. A., . . . . . Programmes, . . . . .	29	27
Erfurt, Königl Akademie Gemeinnütziger Wissenschaften, . . . . .		1
Erlangen, Physikalisch-medicinische Societät, . . . . .		1
Falmouth, Eng., Royal Cornwall Polytechnic Society, . . . . .		1
Felton, Cyrus, . . . . .		1
Fiske, Mrs. J. H., . . . . . Newspapers, . . . . .		
Flanders, G. T., Lowell, Mass., . . . . .	29	159
Folger, W. C., Nantucket, Mass., . . . . .		7
Foote, Caleb, . . . . . Newspapers, . . . . .	1	1
Frankfurt, Senckenbergische Naturforschende Gesellschaft, . . . . .	1	1
Frankfurt, Zoologische Gesellschaft, . . . . .		9
Freiburg, Naturforschende Gesellschaft, . . . . .		1
Frothingham, J. H., Brooklyn, N. Y., . . . . .		13
Gate, B., . . . . .		1
Geneve, Institut National, . . . . .	2	
Geneve, Société de Physique et d' Histoire Naturelle, . . . . .		1
Gifford, Mrs. R. B., . . . . . Newspapers, . . . . .		
Glasgow, Natural History Society, . . . . .		1
Goodell, A. C., Jr., . . . . . Newspapers, . . . . .	40	
Goodhue, Wm., }	16	100
Tolman, Mr., }		
Gray, A. F., Danversport, Mass., . . . . .		24
Green, S. A., Boston, Mass., . . . . .	5	144
Hagar, D. B., . . . . .	6	
Hale, J. L., . . . . .		1
Hamburg, Naturwissenschaftlicher Verein, . . . . .		1
Harrison, G. L., Philadelphia, Penn., . . . . .	1	
Hart, C. H., Philadelphia, Penn., . . . . .	1	1
Hartranft, John F., Harrisburg, Penn., . . . . .	3	
Hill, Benj. D., Peabody, Mass., . . . . .	1	
Hilton, William, . . . . .		1
Hitchcock, E., Amherst, . . . . .	1	147
Hodges, Miss M. O., . . . . .		1

	Vols.	Pam
Holmes, J. C., Detroit, Mich., . . . . .	1	1
Howe, Memorial Committee, . . . . .	1	
Hoyt, Hiram, . . . . .	28	
Hugo, L., Paris, France, . . . . .		1
Hull, Hugh M., . . . . .		1
Hunt, Mrs. Thomas, . . . . .	50	
Hunt, T. F., . . . . .	29	23
Illinois State Board of Agriculture, . . . . .		1
India Geological Survey, . . . . .		13
Iowa State Historical Society, . . . . .		1
Jelly, W. H., . . . . .	6	
Jenison, O. A., Lansing, Mich., . . . . .		1
Johnson, C. B., . . . . .	2	123
Kansas Academy of Science, . . . . .	1	
Kato, H., . . . . .		1
Kimball, James, . . . . . Newspapers,		21
Kingsley, J. S., . . . . .		79
Kjöbenhavn, Botanisk Tidsskrift, . . . . .		1
Kjöbenhavn, Kongelige Danske Videnskabernes Selskab,		3
Kjöbenhavn Société Royale des Antiquaries du Nord, . .		3
Lathrop, Mrs. L. M., Hamilton, Mass., . . . . .	5	
Lee, John C., . . . . . Newspapers,		
Leeds, Philosophical and Literary Society, . . . . .		2
Le Mans, Société d'Agriculture, Sciences et Arts de la Sarthe, . . . . .	1	2
London, Royal Society, . . . . .		9
Long Island Historical Society, . . . . .		1
Loring, Geo. B., . . . . . Photographs,		209
Lupton, N. T., Nashville, Tenn., . . . . .		3
Luxembourg, Société des Sciences Naturelles du Grand- Duché, . . . . .	1	
Lynn, City of, . . . . .	1	
Lynn, Public Library, . . . . .		1
Mack, Miss E. C., . . . . .	2	
Mack, William, . . . . .	1	
Maine Genealogical and Biographical Society, . . . .		2
Manning, Francis H., Boston, Mass., . . . . .	5	
Manning, Richard C., . . . . . Newspapers,	15	253
Manning, Robert, . . . . . Newspapers,	4	50
Marburg, Gesellschaft zur Beförderung der Gesammtten Naturwissenschaften, . . . . .	2	3
Marsh, Prof. O. C., New Haven, Conn., . . . . .		3
Maryland Historical Society, . . . . .		1
Massachusetts General Hospital, . . . . .		1



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Massachusetts Historical Society, . . . . .	4	
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Mecklenburg, Vereins der Freunde, . . . . .	1	
Merritt, Mrs. L. F., . . . . . Newspaper,		
Mexico Museo Nacional, . . . . .		1
Minnesota Historical Society, . . . . .		2
Mount Holyoke Female Seminary, . . . . .		1
München, Königlich Bayerischen Akademie der Wissen- schaften, . . . . .		6
Needham, Daniel, . . . . .		2
Neuchâtel Société des Sciences Naturelles, . . . . .		1
Nevins, A. H., . . . . .	1	
Nevins, W. S., . . . . . Newspapers,		
New England Historic-Genealogical Society, . . . . .	1	5
New England Society of Orange, . . . . .		1
New Hampshire Historical Society, . . . . .	30	291
New Haven, Yale College, . . . . .		4
New Jersey Historical Society, . . . . .		2
New York American Geographical Society, . . . . .		2
New York Chamber of Commerce, . . . . .	1	
New York Genealogical and Biographical Society, . . . . .		2
New York State Library, . . . . .		1
New South Wales Royal Society, . . . . .		1
Nichols, J. H., . . . . . Newspapers,		50
Nichols, Miss Mary, . . . . .		61
Nichols, The Misses, . . . . .	11	
Nichols, Miss Sally, . . . . .	8	
Nourse, C. C., Des Moines, Iowa, . . . . .		1
Nuttall Ornithological Club, . . . . .		3
Oliver, Henry K., . . . . .	2	25
Packard, A. S., Jr., . . . . .		1
Page, Miss A., Danvers, Mass., . . . . .		330
Palfray, C. W., . . . . .	4	59
Palmer, Edward, . . . . .	1	
Paris, Journal de Conchylogie, . . . . .		2
Paris Société d'Acclimation, . . . . .		6
Paris Société d'Anthropologie, . . . . .		2
Peele, Miss E. R., . . . . .	22	23
Pennsylvania Historical Society, . . . . .		4
Perkins, A. C., Exeter, N. H., . . . . .		5
Perkins, Geo. A., . . . . .	1	422
Perry, W. S., Davenport, Iowa, . . . . .		7
Philadelphia, American Philosophical Society, . . . . .		3

	Vols.	Pam.
Philadelphia Library Company, . . . . .	3	19
Philadelphia Zoological Society, . . . . .		2
Pierce, H. B., . . . . .	5	
Pool, Wellington, Wenham, Mass., . . . . .		2
Poole, W. F., Chicago, Ill., . . . . .		4
Poor, Alfred, . . . . .		2
Poore, Benj. P., . . . . .	2	
Pope, Miss Lydia, . . . . .		1
Portland Institute, . . . . .	38	28
Portuguese Centennial Commission, . . . . .		3
Price, John, Manchester, Mass., . . . . .	47	43
Putnam, Rev. A. P., Brooklyn, N. Y., . . . . .		23
Putnam, F. W., . . . . .	2	40
Putnam, H. W., . . . . .	7	12
Quint, Rev. A. H., New Bedford, Mass., . . . . .	1	1
Randolph, Mass., Turner Free Library, . . . . .	1	
Rantoul, R. S., . . . . .		1
Reading, Penn., Society of Natural Sciences, . . . . .		1
Regensburg, Königliche Bayerische botanische Gesellschaft, . . . . .	1	
Roberts, David, . . . . .	1	16
Robeson, Geo. M., . . . . .	1	
Robinson, John, . . . . .	2	86
Ropes, Miss, . . . . .	1	
Salem, City of, . . . . .	1	
San Diego, Cal., Society, . . . . .		
San Francisco, Cal., Mercantile Library Association, . . . . .		11
'S Gravenhague, Nederlandsche Entomologische Vereeniging, . . . . .		6
Smith, C. C., . . . . .		2
Smith, N. A., . . . . .		32
Smithsonian Institution, . . . . .	1	
Somersetshire Archæological and Natural History Society, . . . . .	1	
Sotheran, Henry, . . . . .	1	
Spofford, A. R., Washington, D. C., . . . . .		1
Stickney, M. A., . . . . .		11
St. Gallen, St. Gallische Gesellschaft, . . . . .		1
St. Louis Academy Science, . . . . .		1
St. Peterburg, Impetat Akademya Nauk, . . . . .		22
Stockholm, Royal Swedish Academy of Sciences, . . . . .	3	1
Stone, E. M., Providence, R. I., . . . . .		1
Stoute, Miss M. H., . . . . . Newspapers, . . . . .		1
Stout, A B., . . . . .		1
Tasmania, Government of, . . . . .	3	2
Tasmania, Royal Society, . . . . .	1	

	Vols.	Pam.
Tennessee, State of, . . . . .	62	41
Thompson, C. P., . . . . .	11	
Thompson, J. W., . . . . .		1
Tokio, Japan, University of, . . . . .	2	5
Tucker, Jona., Estate of, . . . . .	102	75
Tyler, W., . . . . .		3
Unknown, . . . . .	1	
Upham, Wm. P., . . . . .	4	
Upsal, Kongliga Vetenskaps-Societeten, . . . . .	1	
U. S. Bureau of Education, . . . . .		3
U. S. Dept. of Interior, . . . . .	116	20
U. S. Dept. of Engineers, . . . . .	7	
U. S. Dept. of State, . . . . .	1	1
U. S. Naval Observatory, . . . . .		1
U. S. Patent Office, . . . . .		49
U. S. Treasury Dept. . . . .	2	
Van Name, A., New Haven, Conn., . . . . .	3	6
Venezuela, Gaceta Cientifica, . . . . .		5
Vermont State Library, . . . . .	10	2
Vermont, University of, . . . . .		1
Vilas, C. H., Chicago, Ills., . . . . .	1	
Walker, Abbot, . . . . .	38	
Walton, E. N., . . . . .		1
Ware, Darwin E., Boston, Mass., . . . . .	1	
Waters, E. S., . . . . .		1
Waters, H. F. . . . . Newspapers,		
Waters, J. L., . . . . .		35
Watson, Miss C. A., . . . . .	1	
Webber, C. H., } . . . . .	1	
Nevins, W. S., } . . . . .		
Welsh, W. L., . . . . .	3	6
Wheatland, Miss E., . . . . .		1
Wheatland, Miss M. G., . . . . .	3	45
Whipple, Geo. M., . . . . .	48	51
Whipple, Miss I. G., . . . . .	1	2
Whitmore, W. H., Boston, Mass., . . . . .		1
Wien, K. K. Zoologische botanische Gesellschaft, . . . . .	1	
Wilder, M. P., Dorchester, Mass., . . . . .		2
Williams College, . . . . .		10
Williams, James, . . . . .	1	
Wilson, Miss L. W., . . . . . Newspapers,		
Winchester Home Corporation, . . . . .		1
Winthrop, R. C., Boston, . . . . .		1
Wisconsin State Historical Society, . . . . .	26	46

	Vols.	Pam.
Wisconsin, Naturhistorischen Vereins, . . . . .		1
Worcester American Antiquarian Society, . . . . .		3
Worcester Society of Antiquity, . . . . .		1
Würzburg, Physikalisch-medicinische Gesellschaft, . . . . .		3
Yeomans, W. H., . . . . .	4	25

The following have been received from editors or publishers:—

American Bookseller.	Lynn City Item.
American Journal of Education.	Lynn Semi-Weekly Reporter.
American Journal of Science.	Nation.
American Naturalist.	Nature.
Beetle and Wedge.	Our Dumb Animals.
Boston Globe.	Peabody Press.
Boston Herald.	Peabody Reporter.
Dexter Smith's Paper.	Quaritch's Catalogue.
European Mail.	Sailors' Magazine and Seamen's Friend.
Forest and Stream.	Salem Gazette.
Francis's Catalogue.	Salem Observer.
Gardener's Monthly.	Salem Post.
Gurney's Weekly.	Salem Register.
Hardwicke's Science Gossip.	Turner's Public Spirit.
Ipswich Chronicle.	Vox Humana.
Lawrence American.	

**FINANCIAL.**—The Treasurer's Report exhibits a statement of the receipts and expenditures during the past year.

#### DEBITS.

##### *General Account.*

Athenæum, for Rent and Librarian, . . . . .	\$350 00
Salaries, \$1,466.32; Coal, \$115.00; Gas, \$43.77, . . . . .	1,625 09
Lectures and Concerts, \$756.32; Publications, \$864.05, . . . . .	1,620 37
Express and Postage, 77.69; Insurance, 40.00; Printing, 25.71, . . . . .	153 40
Excursions, \$2,606.42; Sundries, \$190.71; Stationery, \$20.00, . . . . .	2,817 13
Alterations and repairs of cases, . . . . .	358 83
	<hr/> \$6,924 82

##### *Historical.*

Books, \$8.30; Binding, \$62.78, . . . . .	71 08
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##### *Natural History and Horticulture.*

Paid for binding, . . . . .	50 00
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*Ditmore Fund.*

Paid F. S. Perkins, . . . . .	127 00
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*Ladies' Fair Fund.*

Old Colony Railroad Bond, . . . . .	1,046 17
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*Ladies' Centennial Committee.*

Books and Binding, . . . . .	138 83
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Balance in hands of Treasurer, . . . . .	140 98
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	<u>8,504 88</u>
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## CREDITS.

By Balance of 1877 Account, . . . . .	7 85
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*General Account.*

Dividends Webster Bank, . . . . .	10 00
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Assessments, \$1,011.00; Publications, \$338.28, . . . . .	1,349 28
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Sundries (Piano), 255.60; Life Membership, 30.00, . . . . .	285 60
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Athenæum proportion of coal and janitor, . . . . .	142 45
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Excursions, \$2,924.55; Lectures and Concerts, \$1,206.76, . . . . .	4,131 31
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Subscription, \$140.00; Refunded Bank Tax, \$10.91, . . . . .	150 91
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Salem Savings Bank, . . . . .	332 37
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	<u>6,401 72</u>
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*Historical.*

Dividends Naumkeag Bank, . . . . .	16 00
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*Natural History and Horticulture.*

Dividends Portland, Saco & Portsmouth Railroad, . . . . .	12 00
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Dividends Lowell Bleachery, . . . . .	24 00
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	<u>36 00</u>
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*Davis Fund.*

Coupons Burlington & Missouri R. R., . . . . .	140 00
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Coupons Dixon & Peoria R. R., . . . . .	240 00
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	<u>380 00</u>
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*Ditmore Fund.*

Coupons Chicago City Bonds, . . . . .	70 00
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Interest on notes, . . . . .	127 00
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	<u>197 00</u>
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*Ladies' Fair Fund.*

From Salem Savings Bank, . . . . .	1,046 49
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Old Colony R. R., . . . . .	30 00
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	<u>1,076 49</u>
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*Ladies' Centennial Fund.*

Cash received, . . . . .	389 62
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	<u>8,504 88</u>
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[To be continued.]

# BULLETIN

OF THE

## ESSEX INSTITUTE.

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VOL. 10.      SALEM, JULY, AUG., SEPT., 1878.    Nos. 7, 8, 9.

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ANNUAL MEETING, MONDAY, MAY 20, 1878.

[Continued from last number.]

**HORTICULTURAL.**—The annual exhibition opened on Wednesday evening, Sept. 19, 1877, and continued to the Friday evening following. The display was more than ordinarily creditable; and, considering that the present is not a great fruit year, it is better than there was reason to expect.

The following is a list of contributors:—*Fruit*, Charles A. Ropes, George D. Glover, A. D. Scott, Mrs. E. Emerton, Miss Marion C. Allen, M. P. Locke, Mrs. A. Edwards, James P. Cook, Miss Belle Leavitt, J. P. Chandler, T. N. Covell, Jos. A. Goldthwaite, N. A. Horton, Miss S. O. Russell, Mrs. George West, H. M. Barker, Mrs. John Barlow, Volney C. Stowe, H. Andrews, W. H. Dennett, Mrs. W. F. Gardner, José Margati, Stephen Thayer, F. Symonds, T. Fisher, Mrs. G. E. Bailey, J. W. Goldthwaite, T. Ashby, George Russell, Edwin Very, Mrs. J. F. Read, S. B. Osborne, E. Goss, Miss E. P. Richardson, David Pingree, Mrs. J. O. Safford, C. M.

Richardson, Ezra Cleaves, George Pettengill, Mary K. Robinson, Mrs. F. S. Peck, Moses S. Prime, Dr. Lamb, M. P. Locke, Dorcas C. Nourse, F. Symonds, D. S. Osborne, W. H. Maloon, S. Day, Reuben Floyd, George F. Brown, Henry V. Buxton, Mrs. William Maloon. *Vegetables*, L. W. Goldthwaite, Wm. Mack, Robert Manning, H. Andrews, Plummer Farm School, E. C. Larrabee, Silas M. Locke, George D. Glover. *Potted Plants*, John Robinson, Harmony Grove Green Houses, Mrs. Charles F. Williams. *Flowers*, from A. H. Dunlap & Son, of Nashua, N. H., Charles A. Putnam, Francis Putnam, Mrs. W. F. Gardner, Mary T. Ropes, George D. Glover, F. Lamson, Mrs. L. P. Weston, Belle Leavitt, Lottie F. Chase, Mrs. George B. Prince, Mrs. E. Emmer-ton, Mrs. T. N. Covell, William H. Whipple, Miss Brooks, Miss Clark, Mrs. James B. Nichols, Mrs. J. O. Safford, Mrs. John Webster, Dorcas C. Nourse, Mrs. Clemons, Rebecca B. Manning, Edward Osgood, C. A. Buxton, Mrs. N. A. Horton, George Russell, Mary Saunders, E. Carlton, John Robinson, F. Warner, L. V. Symonds.

PUBLICATIONS have been issued as heretofore,—the BULLETIN, vol. 9, and the HISTORICAL COLLECTIONS, vol. xiv. The exchange list, with few exceptions, continues the same as last year.

EXCURSIONS.—Three have been made during the year, one to the Hoosac Tunnel and Saratoga Springs, one to the White Mountains, and the third to Newport, R. I. At the mountains an interesting and largely attended meeting was held in the parlors of the Crawford House, where an original poem was read by the Rev. Charles T. Brooks. Prof. Charles H. Hitchcock spoke at length on the "Geology of the Mountain Region," and Dr. H.

Wheatland and Dr. G. A. Perkins gave their personal experience of travel on the White Mountain routes in the years 1832 and 1834. These excursions were all enjoyable and successful socially.

The coming year will probably be an active one in the annals of the Institute. It is proposed to celebrate in an appropriate manner the 250th anniversary of the landing of Gov. John Endicott at Salem. The anniversary occurs on Wednesday, Sept. 18, 1878, and an efficient committee has already been chosen and are making arrangements for a celebration which, it is hoped, may be worthy of the occasion commemorated.

Mr. JOHN ROBINSON reported the following resolutions on the death of Mr. FRANCIS PUTNAM :

*Whereas*, The members of the Essex Institute have learned with profound regret of the decease of Francis Putnam, a valued member from its organization, and for many years one of its most active and faithful officers; and, desiring to place upon record its appreciation of his character, do hereby submit the following resolutions:—

*Resolved*, That the Institute has long recognized with pleasure the merited distinction which Mr. Putnam had attained by his acquaintance with and skill in the cultivation of rare and choice flowers; a distinction which is widely spread, and will always enroll his name among the most successful laborers in floriculture.

*Resolved*, That the Institute remembers with cordial appreciation his large and generous contributions, for a period of more than forty years, to its Horticultural Exhibitions, tending, thereby, largely to foster and elevate the refining taste of horticulture in this country.

*Resolved*, That his decease must be regarded as a great loss to horticulture, and will serve to remind the Institute of the gradual disappearance from its roll of membership, the names of those early pioneers who initiated the move-



ment that has been so productive of good results in the promotion of horticultural science.

*Resolved*, That a copy of these resolutions be placed on the records, and also that a copy be sent to the family of the deceased.

The resolutions were unanimously adopted.

*Voted*, To proceed to the election of officers for the year ensuing and until others shall be chosen in their stead. Messrs. Robinson and Cooke were requested to receive, assort, and count the votes.

The following were elected:—

**PRESIDENT:**

HENRY WHEATLAND.

**VICE-PRESIDENTS:**

ABNER C. GOODELL, JR.    WILLIAM SUTTON.    FREDERICK W. PUTNAM.  
DANIEL B. HAGAR.

**SECRETARY:**

GEORGE M. WHIPPLE.

**TREASURER:**

HENRY M. BROOKS.

**AUDITOR:**

RICHARD C. MANNING.

**LIBRARIAN:**

WILLIAM P. UPHAM.

**CURATORS:**

*History*—JAMES KIMBALL.

*Manuscripts*—WILLIAM P. UPHAM.

*Archæology*—FREDERICK W. PUTNAM.

*Numismatics*—MATTHEW A. STICKNEY.

*Geology*—ALPHEUS S. PACKARD, JR.

*Botany*—GEORGE D. PHIPPEN.

*Zoology*—EDWARD S. MORSE.

*Horticulture*—HENRY W. PUTNAM.

*Music*—ARTHUR W. FOOTE.

*Painting & Sculpture*—T. F. HUNT,

*Technology*—EDWIN C. BOLLES.

**COMMITTEES:**

*Finance:*

JAMES UPTON.    JAMES O. SAFFORD.    JAMES KIMBALL.    HENRY M. BROOKS.

*Library:*

CHAS. W. PALFRAT.

JOSEPH G. WATERS.

HENRY F. KING.

GEORGE F. FLINT.

WM. NEILSON.

*Publication:*

ABNER C. GOODELL, JR.      EDWARD S. ATWOOD.      EDWIN C. BOLLES  
JAMES KIMBALL.      T. F. HUNT.

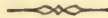
*Lecture:*

WILLIAM D. NORTHEND.      AMOS H. JOHNSON.      FREDERICK W. PUTNAM.  
ARTHUR L. HUNTINGTON.      FIELDER ISRAEL.

*Field Meeting:*

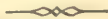
GEORGE A. PERKINS, Salem.	FRANCIS H. APPLETON, Peabody.
GEORGE COGSWELL, Bradford.	LEWIS N. TAPPAN, Manchester.
GEORGE D. PHIPPEN, Salem.	FRANCIS H. JOHNSON, Andover.
GEORGE PERKINS, Salem.	RICHARD S. SPOFFORD, Newburyport.
EBEN N. WALTON, Salem.	NATHANIEL A. HORTON, Salem.

On motion of W. D. NORTHEND, the committee on the celebration of the landing of Gov. Endicott was authorized to enlarge its number, appoint sub-committees, and arrange plans for carrying out the celebration in the most appropriate manner.



MONDAY, JUNE 3, 1878.

At a regular meeting this evening Mr. W. W. Northend was duly elected a member.



FIELD MEETING AT CENTENNIAL GROVE, ESSEX,

MONDAY, JUNE 24, 1878.

FIELD MEETING this day at the Centennial Grove, on the shore of Chebacco pond, Essex. The main party left Salem at 8.10, A. M., and spent the forenoon in search of various specimens of interest. Mr. S. B. Buttrick conducted the botanic party, Mr. J. H. Emerton those interested in insect life, and Prof. Huntington those in mineralogy and geology.

At 3, P. M., the afternoon session was held in a pavilion on the grounds. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

The PRESIDENT in his introductory remarks alluded briefly to four sons of the town of Essex who had lived in Salem, and had been conspicuous members of the bar of this county, viz. : Joseph Perkins, Rufus Choate, Jonathan C. Perkins, and the present Judge of Probate, G. F. Choate.

Mr. JAMES H. EMERTON submitted his report and in answer to questions of several members Mr. Emerton explained the differences between the spiders and their nearest allies.

The Arachnida consist of three orders, of which the spiders form one, distinguished by the division of their bodies into two distinct regions, by their poison jaws, and by their spinning habits. Another order includes the daddy-long-legs, the scorpions; and a few other small families, most of which have hard-jointed skins like crustacea. The third order consists of the mites and their allies, mostly small parasitic animals passing through a metamorphosis after hatching before they get the full number of limbs. To this last order belong the common red spider on plants and the red water spider.

Mr. S. B. BUTTRICK presented a list of plants collected during the day :

*Krigia virginica.*  
*Azalea viscosa.*  
*Potentilla argentata.*  
*Cistus canadensis.*  
*Mitchella repens.*  
*Marchantia polymorpha.*  
*Melampyrum* ———  
*Viburnum dentata.*

*Lysimachia quadrifolia.*  
*Sisymbrium anceps.*  
*Galium* ———  
*Pyrola rotundifolia.*  
*Viola blanda.*  
*Drosera angustifolia.*  
*Cornus canadensis.*  
*Pogonia* ———

Prof. J. H. HUNTINGTON exhibited some specimens of minerals which he had collected and spoke of the geological features of the vicinity.

Rev. C. C. BEAMAN, formerly of Salem, spoke of the pleasure he had enjoyed at being present at this meeting, and warmly commended the work of the Institute.

Mr. JOHN ROBINSON read a paper on the

*The Life of a Pine Tree.*

At the field meeting at Boxford, during the summer of 1877, one of the residents of that town, present at the meeting held for discussion in the afternoon, asked this question: "Can you tell me where the seeds of the Pine trees are, and how to plant them in order to produce young trees?" I had not thought until then of bringing up before a field meeting anything which seemed so simple as this; but, upon reflection, it seemed to me that perhaps something might be proposed upon the subject, which would be of sufficient interest to present at a field meeting, and I have, therefore, prepared the following sketch of the life of a pine tree.

Suppose we commence by examining the seed, which will be found enclosed among the scales of the cone.<sup>1</sup>

The seeds are in pairs, each seed being provided with a membranous wing, which renders it more easily blown to great distances by the wind, as the seed falls to the ground. In the seed will be found, if the magnifying glass is used, a little embryo showing several rudimentary leaves, and a radicle to produce the root. The seeds of pines germinate readily, and the little trees are found abundantly in the vicinity of pine groves.

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<sup>1</sup> As presented at the meeting, the paper was illustrated by several diagrams specimens of wood, cones, flowers, etc.



The roots of the pine do not reach deeply into the ground, even with large trees, but they spread very much, as can be seen by examining the upturned roots of some tree prostrated by a gale.

The trunk of the tree increases by the annual deposit of a layer of wood outside those of previous years ; when pines are growing thickly together, the lower branches of the trees die, and, falling off, the succeeding layers of wood and bark cover the places smoothly where they once projected, leaving the earlier portion of the branch in the centre of the tree as a knot. A cone was shown at one of the meetings a year or two since, which was imbedded in this same manner, and was found in splitting a piece of pine wood.<sup>2</sup>

The leaves of the pine are produced in little tufts, as if we were to pull through our hand a stem of some plant, allowing the leaves to remain between our fingers in a bunch. Each fascicle of White pine has five leaves, of Red pine, two, of Pitch pine, three.

The flowers are of two sorts, male and female, produced on different parts of the same tree, or upon different trees ; the male, or staminate flowers, are on the young shoots, and consist of masses of pollen sacks clustered together, which, when ripe, burst open, allowing the pollen to escape in great quantities.<sup>3</sup>

<sup>2</sup> At the close of the meeting held for discussions, at which this paper was presented, in answer to the question : " Why is Michigan pine stock clearer than that of home production ? "

Mr. John Proctor, of Essex, a gentleman of experience in judging lumber, said : " The clear stock comes from the large pines ; it is cut from the lower trunk, from the outside towards the centre of the tree, before the knots, which are always to be found at the heart of every tree, are reached. The knotty boards are sold as second quality stock, which often comes from the same tree as the clear. "

<sup>3</sup> I find in Emerson's *Trees and Shrubs of Mass.*, 1846, the following : —

" The yellow pollen, which is very abundant, and being as light and fine as dust, has been carried by the wind from a forest of pines, and spread upon the ground at a great distance. This affords a probable explanation of the stories which have

The female or pistillate flowers resemble very small cones, and are usually upon the higher branches of the tree. When in condition to be fertilized, they are erect, and the scales are open to receive the pollen grains which may be wafted to them by the wind. The pollen acts directly upon the ovules, of which there are two in each scale of the young cones. When fertilized, the scales close, and the cone becomes pendant instead of erect. With our pines, the cones grow to considerable size by the end of the first season, increasing their size and perfecting at the close of the second season, when the seeds may be collected. By the spring following, the seeds will fall from the cones.

The seeds of the pine may remain in, or on the ground for a long time, without injury, protected by the dampness and coolness of fallen leaves. But if the old trees are cut away, admitting the light and heat of the sun, these latent seeds will soon germinate, and in a few years a healthy new growth of pines will be the result, provided nature is left to herself, and the too often wickedly reckless hand of man does not interfere.

The pines are to us in New England the most valuable forest trees, and the ones best adapted to our soils and climate, but there are at present but few of those grand old trees which our forefathers walked beneath when Essex county was first settled. I have, in company with Mr. J. H. Sears, of Danvers, visited and measured several of the largest White pines in Boxford, Andover and Middleton, where, undoubtedly, are situated the largest trees of this species now left standing in the county. Several

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been told, and which have been regarded with superstition or incredulity, of showers of sulphur." Lambert describing the common Scotch fir, says: "The pollen is sometimes in spring carried away by the wind in such quantities as to alarm the ignorant of the notion of its raining brimstone."—Lambert's *Genus Pinus*, London, 1828-37.

trees measured were from 10 to 12 feet in circumference, 3 feet from the ground, and one with a very irregularly shaped head measured  $13\frac{1}{2}$  feet at just above the ground, and 12 feet in circumference as high as we could place the tape. Few trees here exceed a height of 100 feet. Many persons here present may remember the exhibit made at the Centennial Exhibition by the Canadian lumber dealers, where one huge section of a White pine was shown 8 feet 6 inches in diameter, or  $25\frac{1}{2}$  feet in circumference. Few such trees exist now.

Emerson speaks in "Trees and Shrubs of Mass.," of a White pine tree in the eastern part of New York state, which was 240 feet high; and one in Lancaster, N. H. was found, which measured 264 feet in height.

A mast was made in N. H. fifty years ago, 90 feet long, which had a diameter of 36 inches at the base and 24 at the summit, a difference so slight, as not to be perceptible to a person standing at the smaller end, looking towards the larger.<sup>4</sup>

The pines belong to a large family of plants called by botanists the Coniferæ, or Cone-bearers, referring to the peculiar fruit borne by most of the trees of this order.

The Coniferæ are found to have made their first appearance upon the earth at about the same time as the ferns, during the Devonian, or age of fishes. At that time, and during the succeeding periods, there were many huge plants, called *Lepidodendron*, and *Sigillaria*, which had trunks as large, and as high as many pines. These were the ancestors of our club mosses, which only now grow to a foot high.

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<sup>4</sup> The Pitch pine does not reach the size of the White pine, and with us there are few very large trees.

The Red pine in Essex county is now and then seen, 18 inches in diameter and perhaps 70 feet high.

These fossil plants bore many resemblances to the pines that then grew, and also to the ferns; and even now, were I to point out all the curious and wonderful processes that the little ovule and pollen grains go through, before the seed is perfected, you would see at once that all the resemblances are not lost yet, between the pines, ferns and club mosses as they are now found. Even the outward appearance of one of our *Lycopodiums*, or club mosses, is so much like a pine tree, that one of its common names is "Ground Pine." But in the old geologic time, before the different members of the vegetable kingdom had grown so far away from each other, so to speak, these resemblances between the Conifers and Cryptogams were much stronger than we find them now.

The nearest relations to the Pines we have in Essex county, are the Spruce and Larch; but all the members of the family *Coniferæ* have so many striking characteristics in common, that any of our native species would at once be recognized as belonging to that family.

They are as follows:—

<i>Pinus rigida</i> , . . . . .	Pitch Pine.
<i>Pinus resinosa</i> , . . . . .	Red Pine.
<i>Pinus Strobus</i> , . . . . .	White Pine.
<i>Abies nigra</i> , . . . . .	Black Spruce.
<i>Abies Canadensis</i> , . . . . .	Hemlock Spruce.
<i>Larix Americana</i> , . . . . .	Larch, or Hackmatack.
<i>Cupressus thyoides</i> , . . . . .	White Cedar.
<i>Juniperus communis</i> , . . . . .	Common Juniper.
<i>Juniperus Virginiana</i> , . . . . .	Red Cedar.
<i>Taxus baccata</i> , var. <i>Canadensis</i> ,	American Yew, or Ground Hemlock.

These are all the Conifers we have growing naturally within the limits of Essex county. Beside these there are quite common in cultivation (and rarely some of them are found to have sprung up from scattered seeds), the following: Scotch Pine, Austrian Pine, Norway Spruce,



White Spruce, Arbor-vitæ, European Larch, Southern Cypress and English Yew.

A few other species of the Coniferæ are occasionally met with in cultivation.

The Ginkgo tree, a native of Japan, is often seen in gardens, but owing to its peculiar fan-shaped leaves would not, until the fruit and wood were examined, be supposed to belong to the Conifers.

The products of the pines are among the most valuable gifts to man; they even produce food. The seed of the "stone pine" (*P. pinea*), and of a pine growing in California, are so large that they may be eaten very much as peanuts are, the meat being about the same size as that of a single meat of the peanut. It is in the wood, however, that the chief value of our pines is to be found. It is needless to mention the innumerable uses to which the White and Red pine wood is adapted. Its durability, lightness, and strength, to say nothing of its sweetness, a quality not possessed by every wood, render it of value to every trade, and to every man.

The wood of Conifers is not like that of the deciduous forest trees, it possesses but one sort of cell in its construction, while the Oak or Maple have in their wood various sorts of cell structures. The wood structure of a Pine is made up of long cells tapering to each end, and having upon the outside certain dots, or marks. These cells are about  $\frac{1}{8}$  of an inch long, and may be seen by examining with a microscope very thin shavings of the wood.

The strength of the wood of our pines is given by Laslett as follows:—

Pieces of Red, White, and Pitch pines were taken, of the same dimensions, and tested in three ways, as follows:

- I. Weight required to break the wood crossways.
- II. Weight required to tear the wood asunder lengthways.
- III. Weight required to crush the wood.

The pieces for experiments I and II, were 2 inches  $\times$  2 inches  $\times$  30 inches. For experiment III, were cubes 2 inches on each side. The average of six trials in each of the ways brought out these results :—

	<i>Red.</i>	<i>White.</i>	<i>Pitch.</i>
I.	653 lbs.	626 lbs.	1049 lbs.
II.	10,822 "	8,108 "	18,666 "
III.	8½ tons.	7½ tons.	11½ tons.

The White pine and Pitch pine are the most abundant in Essex county. The Red pine is found only in very limited quantities at Boxford, Georgetown, and the towns in that vicinity. Yet we should be interested in the usefulness of this latter species, when considering trees for cultivation.

The Pitch pine as seen by Laslett's experiments has the strongest wood, but for carpenters' work the White pine is every way the best.

The Pitch pine being used in joists and scantlings, chiefly in ship building, and on account of its property of withstanding alternations of wet and dry, it is a particularly good wood for ship pumps, and for water-wheels.

Laslett says, "the wood of the Red pine is not apt to shrink, split, or warp; it stands well, and is a valuable wood for all kinds of construction, and in the domestic arts there need be no limit to its application." Some of the largest and straightest trees are used for masts and spars.<sup>5</sup>

The *Resin*, and the various other substances which are

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<sup>5</sup> Of the beauty and usefulness of the wood of the White pine, it is quite unnecessary to speak here, the greatest difficulty would be encountered in endeavoring to find what it could not be used for.

derived from the resin of the pines, stand only second in value to the wood, as useful products.

"From the great amount of resin contained in the wood of the pine, the wood is very combustible, and remarkable for its durability.' In the wood of most pines the resin does not seem to be deposited during the life of that part. Old trunks are often found consisting almost entirely of heart wood, soft, and of a reddish colour, almost free from resin throughout. Where a branch is broken off, the remaining portion becomes charged with resin, forming what is called a *pitch knot*, extending sometimes to the heart. The same thing takes place through the whole heart of the tree, when full of juices its life is suddenly destroyed. It is commonly supposed that the heart-wood of a trunk of Pitch pine, increases in weight after it has fallen to the ground." *Emerson.*

*Turpentine spirits* is the product of distillation of the crude turpentine, over a gentle fire.

*Pitch* is produced by burning, in a copper vessel, the residuum of the turpentine.

*Tar* is produced by half burning it in a covered vessel.

*Lamp-black* is made by burning the above refuse in a furnace leading to a chamber, in which the "soot" is deposited as a powder, from whence it is collected.

*Venetian Turpentine* is made from the European Larch.

Linnaeus states, "that the Laplanders, for want of cereals, use the inner layer of the bark of the *Scotch pine*, to make into cakes, which are very palatable."

Finally, *Amber* and *Petroleum oil*, are but the products of the fossil pines of the Carboniferous Age.

"The soil natural to pines is that formed originally by the crumbling, or disintegration, of the granitic rocks.

These, in the forms of *gneiss*, *mica slate* and *granite*, are the prevailing rock of Massachusetts, large portions

of which are overspread by the diluvium of sand, formed from them." *Emerson.*

To produce pine forests, or groves, artificially, it is only necessary to procure a sufficient quantity of the seeds, and sow them broadcast among the bushes of various sorts which grow in pasture-land. If the seeds are to be planted in open fields they should be covered but slightly, with a light soil, but on *no account* should they be buried.

The pines are not apt to flourish when used as ornamental trees, if planted singly, as they do not have that protection which is necessary to their healthy growth, and which, when standing thickly in forests, they afford each other.

The Pitch pine grows luxuriantly when planted along the coast, and is invaluable, in many places, to hold together the shifting sands of our county's shores; while it has been shown, by early authors that in Europe, the planting of forests has proved the most profitable way of utilizing barren lands. It is a matter of great surprise that the people of this country should be so slow to follow the foreign example. It is but recently that the subject of tree planting has come to the notice of the people in general. As far as I can learn, the only persons who have ever attempted systematic experiments in aboriculture, in Essex county, are Richard Fay, Esq., at Lynn, and Hon. Benjamin Perley Poore, at Newbury. Neither of these gentlemen, however, have attempted planting large tracts. But Mr. Poore's trees are illustrations of what may be done by very many of our land proprietors, having rendered their owner both satisfaction and profit.

Essex county is noted for its barren hills, and Huckleberry pastures. Near us are examples of land, where, if

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<sup>6</sup> For further information upon tree planting, see Emerson, "Trees and Shrubs of Massachusetts."



four cows can be pastured to the acre, the owner is fortunate. Planted with pines, these lands would be a valuable inheritance to the third generation, and the second generation would have received a handsome amount from the "thinnings," as it is termed, and which it would be necessary to make in fifteen or twenty years.

Is it not that our people take too little heed of the morrow? Is it not that the few dollars expended in planting is begrudged to the next generation? Our institutions are in some respects to blame for the spirit of present selfishness with which our people grow up. We cannot, in a country where all are free and equal, enact laws which shall be as strict as those of European monarchies; we cannot, where the land is cut up into small lots, and owned by persons in many cases dependent on its products, enact laws which shall take from them what they rightfully hold. But the state can remit taxes on land upon which trees may be planted; they can offer inducements to owners, great and small, to plant the sterile land. And greatest and best of all, the people can be educated to that knowledge of nature, and the balance she requires between the trees and the open land, until our people shall, of their own accord, keep that balance true.

The work of the department of aboriculture of the Bussey Institution, under the directorship of Mr. Charles S. Sargent, who has himself published many valuable treatises on this subject, is already beginning to be appreciated. The leading newspapers of the State often devote their editorial columns to notices of this institution and its work; but this is not enough, the local newspapers should do more. These reach the country firesides where they are carefully read and their contents discussed.

These papers can, and ought, to devote many columns

a year to this subject, and point out one after another, the important functions performed by forests in regard to the health, wealth and proper development of the country. It should be introduced into our common schools as a study ; and when this is done, in the half of a generation the young men and women of the land will be prepared to understand the justice and wisdom of state enactments which now almost all would consider hardships. To educated intelligence, rather than by force of law, should we look to see the Pine tree respected and valued, as one of the most precious gifts vouchsafed to the people of Essex county.

Discussion followed, participated in by Mr. E. G. PARKER of Groveland, Mr. ROBINSON and Rev. Messrs. ISRAEL and BOLLES of Salem.

Mr. J. L. STORY of Essex contributed to the museum two Indian arrowheads, and Mr. EBEN STANWOOD, also of Essex, and Mr. ANDREWS, of the same place, several specimens of minerals and insects.

The following resolution was unanimously passed :

*Resolved*, That the cordial thanks of the Essex Institute be and are hereby tendered to the proprietors of the Centennial grove for the use of this grove, and to the citizens of Essex for their aid so generously and so pleasantly tendered and also to the directors of the Eastern railroad for favors received.



FIELD MEETING, WEDNESDAY, JULY 10, 1878.

THE second field meeting, the present season, was held at Juniper Point, Salem Neck, this day.

The forenoon was agreeably spent in rambling about the Neck, examining the specimens at the Marine Zoological Laboratory, and in dredging, for which purpose the fine yacht "Curlew" was kindly placed at the disposition of the party by its owner, Mr. Henry W. Peabody. The dredging was under the direction of Mr. James H. Emerton and confined its field of operations to the waters between the laboratory and Beverly Light. Three hauls were made and a large number of specimens were obtained, including sea anemonies, echinoderms, crustaceans, etc. These, with other specimens in the aquaria at the laboratory, formed the basis of some remarks which Mr. Emerton afterwards made, illustrating many of the varied forms and habits of marine life.

The Zoological Laboratory was opened on the first of June by Messrs. James H. Emerton, of Salem, and C. S. Minot, of Boston, for the purpose of affording facilities to persons engaged in special studies who may desire to make collections and research in the several departments of marine zoology and botany, and not as a school for instruction, although students will be received upon such terms as may be agreed upon. For this purpose the building is admirably situated in close proximity to the sea, easily accessible to the city by street cars, and provided with furniture, microscopes and other instruments, a small library, aquaria, boats and collecting apparatus.

The usual collation was spread at 1.30 P. M., in Juniper Hall. The afternoon session was called to order in the hall at 3 P. M., by the PRESIDENT. Records read, correspondence and donations announced.

The PRESIDENT in his opening remarks alluded to the prominence which the Neck held during the early his-

tory of Salem. He also spoke of the coming of Roger Conant in 1626, and the foundation for the claim which Salem has to that year, as being the date of its first settlement rather than 1628, the date of Endicott's advent. The original settlement was in 1626, and that date is now placed upon the city seal. Conant came under an indenture, bearing the signature of Lord Sheffield, from Council of Plymouth, Devon, England, a company chartered with the right to form settlements between the fortieth and the fiftieth parallels of latitude. Conant settled originally in Cape Ann in 1624, and came from there to Salem in 1626. Endicott's coming in 1628 brought the first permanent organized government, and Conant surrendered all authority and power to him upon his arrival. The Institute will celebrate the 250th anniversary of Endicott's landing in September next, when Hon. W. C. Endicott, a lineal descendant, is to deliver the address. The establishment of the first church at Salem by Francis Higginson, in 1629, will be appropriately commemorated by the First Church and society next year.

Mr. GEORGE D. PHIPPEN followed in the same historical vein. Speaking of Gosnold's first view of the Neck and Salem Harbor in 1602, the coming of Smith in 1614, and the landing of Lady Arbella Johnson and Winthrop on Beverly shore, June 10, 1630, when they mentioned the beautiful aspect of the country and Naumkeag, and also of picking strawberries, gooseberries and sweet single roses in the fields. Mr. Phippen then proceeded to speak of the ancient fortifications. The first fort erected was the Darby fort on Naugus Head. The second was placed upon the higher ground on Sewall street, then called Arbor place, and after the erection of this latter fort, five leather cannon were brought from England and mounted



upon it for use against the Indians, metal ordnance being too heavy and cumbersome for the purpose. Heavy cannon were introduced into Salem as early as 1667. In 1699 the new fort on the heights of the Neck, the present site of Fort Lee, was commenced, and there has always been an earth-work at that place since that time. There were at other times block houses on the Neck, two being placed upon the upper end. The embrasure and outlines of an old earthwork at Hospital Point are still visible. At one time during the revolutionary period there was a considerable settlement on the Neck, known as Watertown. Mention is made, in the early annals, of a fishing village here, and a street called Fish street, which was quite prominent at one time. There is also a tradition of an old "Blue Anchor" tavern as being located on the Neck. Mr. Phippen suggested the erection of guide boards for the convenience of strangers in ascertaining the location of interesting historical points, so numerous in Salem and its vicinity.

Dr. GEORGE A. PERKINS spoke of a battery formerly situated where Mr. H. W. Peabody's house now stands. An iron ball dug from this locality was presented by Mr. Peabody to the Institute.

After explaining briefly the methods of collecting and observing marine animals, Mr. EMERTON described the development of the common starfish, the young of which were at that time found daily in the surface nets. The eggs of the starfish are laid on the bottom, where they soon grow into worm-like animals without any sign of radiation about them. They swim at the surface of the sea, especially on calm evenings, till they become quarter of an inch in length, with long processes from their sides,

along which run lines of cilia, by which the animals move slowly in the water. On the sides of the intestine is developed a system of water tubes that extends through the whole body and opens by a pore on the back. The first appearance of the star-form are five buds on each of the large water tubes running parallel with the intestine. Around these buds grow the five arms of which the starfish is made up. At first they are in a line along the intestine, afterwards the line bends around and the ends unite, so that the arms arrange themselves in a star. Before this takes place the whole of the old larva is absorbed into the new starfish. The pore on the back of the larva becomes the bright colored porous spot on the starfish, and the water system connected with it spreads through the whole body, carrying water to the suckers by which the starfish crawls.

Mr. J. S. KINGSLEY spoke of the anatomy and development of the tunicates, and described their tadpole-like larvæ, which have a dorsal cord similar to that of vertebrates, on account of which they are supposed by many naturalists to be related to the latter animals.

A vote of thanks was passed to Henry W. Peabody, Mr. and Mrs. Wm. F. Ashton, Mrs. Walworth, Mrs. J. H. Webb, Mrs. Hitchings and other residents in Salem for numerous civilities.

The members then adjourned to the Marine Laboratory and spent a short time in the examination of the specimens in its museum.

REGULAR MEETING, MONDAY, JULY 15, 1878.

MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Mrs. George M. Whipple was elected a resident member.

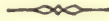
Prof. F. V. Hayden, of Washington, D. C., and Dr. W. J. Hoffman, of Washington, D. C., were elected corresponding members.

The PRESIDENT alluded to the recent decease of Hon. Joseph G. Waters, for twenty-one years the recording secretary of the Essex Historical Society, one of the predecessors of the Institute, and spoke of his great interest in the literary and scientific institutions of this county, his versatile and extensive knowledge of general literature and history, his genial disposition, and his personal worth as a citizen and a scholar.

Judge Waters died at his residence, Pleasant street, Salem, on the 12th instant. He was the son of Capt. Joseph and Mrs. Mary (Dean) Waters of Salem, where he was born July 5, 1796. He graduated at Harvard College in the class of 1816 and studied law with Hon. John Pickering, the well known scholar and lexicographer (Harvard, 1796). He afterwards went to Mississippi, where he resided in the practice of his profession for several years, holding at the same time the office of magistrate, and then returned to Salem. He was a member of the Common Council of Salem in 1836 and 1837, a State Senator in 1835, and a Judge of the Police Court for nearly forty years, until 1875, when he resigned. At one time he conducted the editorial department of the "Salem Observer," always taking much interest in historical studies and literary pursuits. In addition to his

duties as recording secretary of the Essex Historical Society, he has, since its union with the Essex Institute, been one of the curators or a member of some of the standing committees. He was also, since 1864, on the Board of Trustees of the Salem Athenæum and for several years the chairman of the library committee. He married Eliza Greenleaf, daughter of Capt. Penn Townsend, of Salem, who survives him.

On motion of R. C. MANNING, the President and Messrs. James Kimball and G. A. Perkins were chosen a committee to prepare resolutions on the decease of Judge Waters, to be presented at a future meeting.



#### REGULAR MEETING, MONDAY, AUGUST 5, 1878.

MEETING this evening. The PRESIDENT in the chair. Records read.

Mr. W. A. Stearns, of Salem, was elected a resident member.

Miss CAROLINE FOLLANSBEE presented specimens of ribbon agate, sulphate of copper, drusy quartz, lead and silver ore, and other minerals, which were described by Dr. G. A. Perkins.



#### FIELD MEETING AT WEST NEWBURY, THURSDAY, AUGUST 8, 1878.

THE third field meeting of the present season was held this day, at West Newbury.

The members of the Institute residing in Salem and its vicinity left the Eastern railroad station at 8.45, A. M.,



for Newburyport, where they were met by several members from that city, who accompanied them on the excursion; carriages being in readiness to convey the party to the place of meeting. The day was all that could be desired: bright, cool, and sunny.

After a ride of some five or six miles over one of the best roads in the county, the party arrived at the pleasant country seat of Major Ben. Perley Poore, where they were cordially received by that gentleman and his family, who extended to them the hospitalities of the place. An hour was passed in examining the valuable and extensive collections at this place, which excited much interest and admiration, especially the Indian implements, and the continental suite of rooms furnished in the style of the Revolution. There were many curious old relics which represent several generations of the Poore family: military weapons, old pictures and portraits, household utensils, nice old glass and crockery ware, mirrors, candlesticks, and a great variety of things quaint and queer.

The guests were then invited to the dining room, where a fine lunch had been prepared. They then visited the room where Major Poore's valuable historical and literary collections are arranged, and after making a tour of the grounds, inspecting the barns, the famous white cattle, the well arranged gardens and walks, and last, but not least, the noble growth of forest trees, every one planted by Major Poore or his father, once more embarked for West Newbury, bidding an adieu to the kind host and his accomplished family.

We cannot leave without feelings akin to veneration for this old mansion, which has during successive generations been continued in this family. Portions of the old building remain, though additions and alterations have been made from time to time, so that it now presents a somewhat baronial aspect. Here resides the genial proprietor

when released from his arduous duties at Washington, surrounded by many interesting memorials that cannot fail to recall vivid recollections of those who lived during the colonial and provincial and revolutionary periods of our history; and entertaining with liberal hospitality a host of friends who delight to call upon him in this pleasant rural retreat.

*Samuel Poore*, his earliest ancestor in this country, came from England with the family of Richard Dummer, in 1638, at eighteen years of age. At the same time came with them an *Alice Poore*, aged twenty years, who married George Little, of Newbury, and amongst whose descendants have lived many persons of note and enterprise. Also *Daniel Poore*, aged fourteen years, who settled in Andover, Mass., and from whom descended Enoch Poore, a Brigadier General in the Revolutionary Army, born in Andover, Mass., 1738, and died near Hackensack, N. J., Sept. 8, 1780; Rev. Daniel Poore, D. D., born in Danvers, June 27, 1789, graduate of Dartmouth College, 1811, and Andover Theological Seminary, 1814, ordained as missionary, June 21, 1815, and sailed for Ceylon on the 23rd of the following October; he was a man of eminent piety and learning and spent his life among these people in arduous and faithful labors; he died at Jaffna, Ceylon, Feb. 3, 1855; and John Alfred Poore, the father of the railroad system in Maine, born at Andover, Me., Jan. 8, 1808, died at Portland, Sept. 5, 1871, and his brother, Henry V. Poor, editor of the "American Railroad Journal," author of "History of Railroads and Canals in the United States," and other works relating to this and collateral subjects.

The three above named who came with the Dummer family are supposed to have been brothers and sister of *John Poore*, their elder, who also settled in Newbury and

died Nov. 23, 1684, aged sixty-nine, from whom was descended John Poore, a graduate of Harvard in the class of 1775, who established a Female Academy at Philadelphia and died in 1829; and Charles H. Poore, a rear-admiral in the U. S. Navy, born in Cambridge, June 9, 1808, retired from service June 9, 1870.

Major Poore descends through Samuel<sup>2</sup>, who married Rachel Bailey; Samuel<sup>3</sup>, who married Hannah Morse; and Benjamin<sup>4</sup>, who married Judith Noyes, a descendant of Deacon Nicholas Noyes (a brother of Rev. James Noyes, the first minister of Newbury). Benjamin and Judith, we learn, occupied this extensive tract of land which the family have named the Indian Hill farm, and their youngest son and only child who married was Daniel Noyes Poor, born July 16, 1758, graduated Harvard College 1777, physician in Newbury, where he died July 23, 1837; married Lydia Merrill, and among their children was the father of our host, Benjamin Poore.

Major Poore is thus connected with many of the early families in the northern part of the county, and as his mother was a Dodge, he is consequently a kin to a large number in the southern section.

The church at West Newbury was reached in good season, after a pleasant drive through the woods, and by the extensive nurseries of Mr. T. C. Thurlow. Hon. Haydn Brown, of West Newbury, and Horace Brown, Esq., of Salem, members of the Institute, here met the party, and after a visit to the comb factory of Brown & Noyes, where the very interesting processes in the manufacture were closely examined, some of the party visited the residence of Hon. Mr. Brown, where they were pleasantly entertained. Among other curiosities was showed a monstrous pair of ox horns lately sent from Cape Town, South Africa. These horns had a stretch of over two yards

from tip to tip as they grew from the animal's head. They measured forty-seven inches in length and twelve and one-half inches in circumference.

Lunch was served in the church chapel, Mr. and Mrs. Brown and others being lavish in their hospitality and generous attention.

At 2.45, P. M., the afternoon session was held. The PRESIDENT in the chair. Records of last meeting read. Donations and correspondence announced, after which HORACE BROWN, Esq., welcomed the society to West Newbury, being fittingly responded to by the PRESIDENT, who spoke of the previous field day at West Newbury, referred to the various educational associations of the vicinity, and explained the objects and work of the Institute.

HON. HAYDN BROWN gave an interesting and instructive account of the comb factory of which he is one of the proprietors; exhibited the original kit of tools used by Mr. Enoch Noyes, the first manufacturer in Newbury, in 1774; and described the various modifications in machinery from the simple forms at that early period to the improved and complicated constructions of the present time.

JAMES PARTON, Esq., of Newburyport, said that in visiting the comb factory in the morning he had recalled a memorandum of John Quincy Adams. After making a visit to a factory in St. Petersburg, wrote Mr. Adams, "I must go visit a factory every week in order to learn humility." The speaker thought that all his hearers had learned a lesson in humility that day. Mr. Brown had spoken of the progress of mechanical invention within the last quarter of a century, but this progress of invention



is applied to every branch of human intelligence. Mr. Parton considered the New England habit of picnics a public blessing and made some remarks on the advantage of such field days as the Essex Institute is in the habit of holding, saying, that it made people good-natured and amiable to be brought together in a sensible out-door ramble. There is too much ill temper in the country. An Irish orator in Boston, a few evenings since, had flung about some opprobrious epithets in a very reckless manner, but it was not alone Kearney and the frantic idiots that are guilty. In a late number of the "North American Review," Francis Parkman has an article and indulges in gross abuse of those who don't think as he does. He says: "they bray." Wendell Phillips also indulges in a great deal of abuse. One reason is because these gentlemen do not go to picnics and become acquainted with each other. Mr. Parton thought speech making a new species of torture. In speaking of this subject to a young lady, a day or two since, she had found him a book entitled "The Speech Maker's own Book to assist those called upon to make a few remarks on public occasions or to propose a sentiment." From this book Mr. Parton read a number of selections, one of which he thought would apply to Dennis Kearney: "Here's to the man who never lets his tongue cut his own throat." Mr. Parton closed by expressing his great satisfaction at being able to be present at this meeting.

Mr. JAMES H. EMERTON described several insects that had been presented at the meeting, and replied to several questions that were proposed in reference to the same.

Prof. GEORGE DIXON, of Hampton Normal and Agricultural Institute, Hampton, Va., formerly of England,

expressed the great pleasure it gave him in joining the members of the Essex Institute in their third field meeting this year, particularly in so delightful a locality. If there is an interesting spot, your worthy chairman, Dr. Wheatland, is sure to find it and pitch his tent there : a place where the botanist, entomologist, geologist, and even the archæologist may find something interesting. Some may be inclined to think there is little of antiquity to be found in America. I think differently. We are no doubt treading upon ground once occupied by a pre-historic race.

Since last year I have had the pleasure of seeing a little of the Indian character. About three years ago the United States troops, in a skirmish in the Indian Territory, took over sixty prisoners, whom they sent down, in irons, under the charge of Captain Pratt, to St. Augustine, Florida, to be confined in an old fort there. There were among them Cheyennes, Kiowas, and Arapahoes. They soon became perfectly docile, and one by one the Captain had their manacles removed. He took away their blankets, dressed them in cast-off soldiers' garments ; and in order that they might be more like white men they were willing to have their hair cut short, and their ear and nose ornaments removed.

St. Augustine, as you are no doubt all aware, is a favorite winter resort for invalids. The visitors, at first through curiosity, often went down to the fort to see the Indians, who amused their lady friends by singing their war songs and performing their war dances. One of these ladies undertook to give the Indians lessons in English ; others soon joined her, and in a short time many of the Indians could read simple sentences and write a little. They were also taught to sing some of Moody and Sankey's hymns, instead of their war songs. At the end

of three years the term of their imprisonment expired and they were to be sent back to their tribes. Twenty-two of the young men expressed a wish to be further educated before their return. Funds to cover the cost for three years were soon raised, partly from those who had been personally acquainted with them at St. Augustine, and partly from benevolent individuals at a distance. General Armstrong, superintendent of the Hampton Normal and Agricultural Institute, for training colored teachers for the South, was willing to take sixteen of them into his establishment. Arrangements were made for the remaining six to go to other schools in the North. Captain Pratt, wishing the older Indians to see the place where their young men were to be left to be educated, availed himself of an opportunity of bringing them all North by a steamer that was returning to Norfolk, and landed them at the school wharf. They seemed pleased with the place, bade their young men farewell, and, after visiting Washington, were set at liberty in the Indian Territory. Accounts of these returned prisoners have been very encouraging. They have mostly joined themselves to the missionaries, having charge of the schools on the reservations, persuading their people to give up their nomadic life, and settle down to the cultivation of the soil, and have their children educated. Those left at Hampton are very exemplary in their conduct, remarkably neat and cleanly in their person, and are making good progress in their education. They are extremely affectionate; when Captain Pratt left them to take the old folk home, they all embraced him in tears, and were greatly delighted on his return. I have often thought, on viewing their manly forms, and interesting countenances, of the exclamation, I think of St. Augustine, when he beheld the British youths captives in

Rome: "Non Angli sed angeli, si Christiani" (Not English but angels, if Christians). Although we have fallen far short of becoming angels, yet through the civilization and enlightenment of our ancestors by the gospel message, which the Romans brought us, Christianity has spread to the utmost bounds of the earth, and the English language bids fair to become universal. Captain Pratt's great success with these Indian prisoners has led to the idea of establishing an Institution similar to Hampton, for training both young men and women Indians for teachers among their tribes. They would carry back a good report of the white man, and of his wish to be kind to them and do them good. God in his Providence has made the Indians the wards of this nation, and a grave responsibility rests upon the American people. It is very important that the most humane means should be devised for gaining their confidence, and bringing them into obedience, without using force of arms, which only drives them into rebellion, and if persisted in can only end in their extermination. One of the Indian students at Hampton has just received a letter from his tribe. Although all pictures, yet it conveyed to him the painful information of the death of both of his parents. They make these pictures very rapidly. I have with me a fan painted by one of them for his teacher. You will see how very much the figures resemble Egyptian hieroglyphics. By the sale of painted fans and polished sea beans, they raise a little pocket money.

I think the language of the Indian must be very interesting; every word seems to be accompanied by a sign or motion of the hand. When they use the word "*truth*" they place the finger horizontally on the lips and press their hand to their heart. When they repeat the word lie, they put two fingers on their mouth, pointing in dif-



ferent directions, and make a motion with their hand of casting it from them, expressive of disdain. Their Indian names are very peculiar. I will give you a few of them with their translation :—

Ma-ah-chis, Soaring Eagle.

Cow-way-haw-nif, Little Chief.

We-ho-no-cas, White Man.

Tich-ke-mat-se, Squint Eyes.

Nock-ko-ist, Bear's Heart.

Nar-cu-bo-ist, White Bear.

I fear I shall tire you with my account of the Indians.

At our meeting last year at Marblehead Neck, mention was made of the discovery of the satellites of Mars, and of oxygen in the sun by Dr. Draper. This year we have to record the invention of the telephone, microphone, phonograph and tasimeter. No one can yet tell the wonders these instruments will open out when applied, not only to scientific, but to practical uses. The telescope opened out to us objects almost at the utmost bounds of the universe. The microscope brought to view animals so minute that myriads could exist in a drop of water. Then came the spectroscope, which enabled us to discover the composition of luminous bodies both near and distant, showing us that the sun, moon, planets, fixed stars, comets and nebulae, are all composed of metals and gases similar to those found on our earth. Instead of sending messages by signs, the telephone will enable us to send them by word of mouth. With the microphone we shall be able to hear sounds never before audible. We shall be able to hear the rising of the sap, the uniting of particles by chemical affinity, and atoms arranging themselves by polarizations into crystals. If at the creation "the morning stars sang together," may we not be able to catch their music, if they still continue their song? Then

there is the phonograph, by which the vibrations of the voice may be recorded and utterances preserved from generation to generation. What shall we say of the tasimeter, which measures the temperature of the most distant bodies whether they are luminous or not?

Don't you think the prophet Daniel foresaw our day, when he said, "many shall run to and fro and knowledge shall increase"? It has been thought that Isaiah had a glimpse of the locomotive, in his vision of the brethren being brought out of all nations, "upon horses and in chariots, and in litters, and upon mules, and upon swift beasts." He found no animal for comparison when in his vision he saw the train dashing along, so called the locomotive "the swift beast."

If we should be spared to meet another year, we may have still greater discoveries to record. But I must not forget my flowers. A lady has just handed me two specimens: *Clethra alnifolia*, *sweet pepper bush*, and *Rubus odoratus*, *sweet scented bramble*. These are well worthy of cultivation for their sweet perfume and beautiful flowers. Among those I have collected myself on the banks of the Merrimac, and those laid on the table, I find worthy of notice: *Platanthera psycodes*, *purple fringed orchis*; *Teucrium Canadense*, *germander*; *Lysimachia stricta*, *loosestrife*; *Mimulus alatus*, *winged monkey flower*; *Lobelia inflata*, *Indian tobacco*. I also found an English emigrant which I was not aware had found its way over, *Campanula rotundifolia*, *harebell*. This flower is found on the English and Scotch moors, growing among the heather. It has, like many more, bettered its condition by change of country; in its native place it is only a few inches long; some of the specimens I have collected to-day measure fully three feet. At one of your meetings last year I named other emigrants: *Genista tinctoria*, *woad waxen*;

*Urtica dioica*, *Roman nettle*; *Triticum repens*, *couch grass*. These and many others seem to follow in the wake of civilization. The *Urtica dioica* followed the Romans from Italy; and being found where they had their encampments, it is known as the *Roman nettle*. It is not difficult to divine how it got over. Perhaps among the hay used by the Pilgrim fathers in packing their utensils on board the Mayflower it was secreted. From a single plant the downy seed would be wafted and spread rapidly. I saw it to-day growing on a rubbish heap. Although some of these plants are perfect pests to the farmer, yet they may sometimes be found to possess qualities which may make them valuable, even worthy of cultivation. The whole plant of *Genista tinctoria*, *woad waxen*, root, stem, leaf and flower, dyes yellow. Mixed with *Isatis tinctoria*, *woad*, which has also found its way over, it dyes green, while the woad itself, like indigo, dyes blue. With these two plants the ancient British tatooed their bodies. The *Triticum repens*, *couch grass*, makes a paper very superior to that made from the straw of any other grass, and would be used extensively if it could be got in quantity. Even *Urtica dioica*, the *Roman nettle*, has been found lately to contain a fibre in its tissues, stronger and more abundant than that got from the *Cannabis sativa*, *hemp*, and may come to be extensively used in the manufacture of ropes. In riding along this morning I was admiring the *Salix alba*, *white willow*. A gentleman sitting by me said "it is a useless wood." I did not contradict him, but I remembered the wonderful antiseptic properties of the salicylic acid got from the willow, which is likely to make this wood of great value. This acid is perfectly wholesome, without either taste or smell. A merchant in Hamburgh has found that fish impregnated with it will keep perfectly fresh for twenty days.

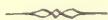
A young gentleman has placed on the table three species of fresh water shells found in the Merrimac river. They are *Physa heterostropha*, *Limnæa elodes*, and *Planorbis lentus*. I ask pardon for encroaching so long on the valuable time of this meeting.

Capt. LUTHER DAME, of Newburyport, and Rev. Mr. DORRITY, of West Newbury, spoke briefly, expressing their interest in the work of the Institute.

Rev. FIELDER ISRAEL, of Salem, offered the following vote, which was unanimously adopted :—

*Voted*, That the thanks of the Essex Institute be offered to Hon. Haydn Brown of West Newbury, to Horace Brown of Salem, and to the ladies and gentlemen of West Newbury, for the numerous courtesies extended to the members of the Institute this day ; to the proprietors of the Second Congregational Society for the use of their church and vestry ; also to Major Ben. Perley Poore for his elegant reception at Indian Hill Farm.

The meeting adjourned at 4.10, P. M. The route to Newburyport was by the famous river road and the chain bridge. The road winds for miles along the shores of the Merrimac river. This ride was one of the features of the day, and was thoroughly enjoyed by all. The party took the 8.25, P. M., train for Salem.



REGULAR MEETING, MONDAY, SEPTEMBER 2, 1878.

MEETING this evening. The PRESIDENT in the chair. Records read. Correspondence and donations announced.

The PRESIDENT offered the following resolutions on



the death of Hon. JOSEPH G. WATERS, which were unanimously adopted :

*Whereas*, The members of the Essex Institute have learned with deep regret the decease of Hon. Joseph G. Waters, a valued member from its organization in 1848, and for many years previous a member of the Essex Historical Society, and desiring to place upon record their appreciation of his character, do hereby submit the following resolutions :

*Resolved*, That the Institute has long recognized with pleasure the merited respect which Mr. Waters had always received from his fellow citizens, not only for his professional acquirements, but for his versatile and extensive knowledge of general literature and history ; a distinction which will keep his memory long in the minds of the people.

*Resolved*, That the Institute remembers with cordial appreciation the eminent services which he had performed for a period of twenty-one years as the recording secretary of the Essex Historical Society, and since the incorporation of that Society with the Institute, that of one of the curators and a member of several of the standing committees.

*Resolved*, That his decease must be regarded as a loss to the historical department of the Institute, and reminds us of the disappearance from our roll of membership of those who were instrumental in directing public attention to the collecting and preserving the memorials of our early history.

*Resolved*, That a copy of these resolutions be placed on the records of the Institute, and also that a copy be sent to the family of the deceased.

## *Additional Notes on the Pine.*

BY JOHN ROBINSON.

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BEFORE the regular publication of the BULLETIN a number of extras of the above paper were sent out.

The very kind reception which it has met and the interest manifested, both by the press and private individuals, make it seem of importance to add a few notes and corrections suggested by gentlemen more familiar with the practical side of arboriculture than the present writer.

As suggested by Mr. J. J. H. Gregory and others, it would be better in referring to the number of cows pastured per acre on certain poor land in the county, to say one cow to four acres, in order to more forcibly represent the average condition of things.

Mr. Jos. S. Fay of Wood's Holl, who has given many years' attention to the cultivation of forest trees, suggests that the statement regarding the roots of the pine, although applicable to the White pine, is not so in the cases of the Red or Pitch pines. These, he says,

"Have tap roots or large single roots extending deeply with a few lateral, but not superficial roots."

Again, regarding the quotation from Emerson where he says :

"The soil natural to most pines is that formed by the crumbling of granitic rocks,"

Mr. Fay writes :

"I think this is far from correct. The soil of Cape Cod is drift, very sandy, and yet its forests are largely of pine. The White pine certainly grows largest in good bottom land or loamy soil."

Mr. Fay is also of opinion that when sowing the pine seeds in pastures, the bushes should be mowed down to prevent the young plants from being smothered ; a much better thing to do would be to collect young seedlings for this purpose. These could be raised in prepared land, or purchased. He says :

"Small seedlings would do well if planted with a spade among bushes, because their heads would come to the air, and soon get above their neighbors."

The following interesting paragraph is taken from an essay on Forestry read by Mr. Fay last spring, before the Society of Arts at the Institute of Technology, an abstract of which appeared in the "Boston Journal" at that time. This essay ought to be published in full in pamphlet form.

"I have been told that within a few days there was sold at auction in North Easton the wood, chiefly pine, standing on an acre and a half of land for the sum of \$225.00, which is \$150.00 per acre. A man present at the sale, who formerly owned the place, said that it was just twenty-five years since he and his two boys in one half-day dug up the trees in an adjoining field, where they were scattered about, and set them out. They were about a foot high. Nothing was ever done to them afterwards. At the time they were planted the land was considered as worth fifteen dollars, or ten dollars per acre. The same farmer planted three and one-half acres about thirty-five years ago, which in the opinion of experienced lumbermen will cut 150 or 160 cords of wood per acre, and is worth \$300.00 to \$350.00 per acre on the stump."

Mr. Chas. S. Sargent has kindly furnished some information regarding the time of ripening of the seeds of the pines, which is not found in the botanies. He says :

"In the White and Red pines the scales open in New England in the middle of September, and of course the seed, or most of it, will fall at once. With the White pine the cones generally drop the same autumn that they ripen, but the Pitch pine retains its cones for years, the manual being wrong in that particular. I do not know exactly at what time the Pitch pine sheds its seeds, but very likely the cones remain unopened until spring. I sent to North Conway for Red pine seeds, and the man found them dropping from the cones by the 10th of September."

Mr. Sargent also writes :

"You say 'But the State *can* remit taxes,' etc. I wish you had said, this State *has* remitted taxes on land planted under certain conditions, by an act which I drafted last winter, and which has passed both houses and become a law without opposition."

The importance of these corrections and suggestions will at once be seen upon reading the above note, and I take this opportunity to acknowledge the kindness on the part of those who so promptly sent them, for I feel it adds much of real value to a paper, which, incomplete as it was, has met with a surprisingly warm reception. I trust it may call attention to a subject soon to be of vital importance among us, and stimulate, among those who happen to see it, a desire to obtain and read fuller and more valuable essays and books upon the subject.

# BULLETIN

OF THE

## ESSEX INSTITUTE.

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VOL. 10. SALEM, OCT., NOV., DEC., 1878. Nos. 10, 11, 12.

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### WHITE MOUNTAIN FIELD MEETING, SEPTEMBER, 1878.

MEMBERS of the Essex Institute, with their friends, numbering about one hundred and twenty-five, left Salem on Tuesday morning, September 3, for their third annual excursion among the White Hills of New Hampshire, and to hold a meeting on Thursday evening at Fabyan's, the base of Mt. Washington. The route, thither, varied somewhat from that of either of the two previous excursions; passing through Lowell, Nashua, Manchester, Concord, to the Weirs, where the steamer "Lady of the Lake" was awaiting the arrival, to take the party over the placid waters of the Lake and among the numerous islands to Centre Harbor, when dinner was served at the Senter House. In the afternoon re-embarked on board the steamer and returned to Weirs, and thence proceeded by rail to Plymouth, where the night was passed at the Pemigewasset House. The next morning, Wednesday, by stages, went to the Profile House through the Pemigewasset valley, stopping at the Flume House to view the various objects of interest in that locality. The scenery of



this valley is beautiful, with high mountains and dark ravines; the road, winding through the woods, then up some steep hills, opens out on lovely landscapes.

Left the Profile House on Thursday, after dinner, and by stage and rail arrived at Fabyan's at 6 P. M.

During the evening in the large parlor, a meeting was held. The PRESIDENT in the chair. Records of the preceding meeting by the Secretary were read.

The PRESIDENT, after a few brief allusions to some of the objects of the Institution, and to the meeting held at Crawford's in September, 1877, called upon Prof. J. H. HUNTINGTON, formerly connected with the Signal Service on Mt. Washington.

The speaker began by saying that, when a college student he visited the mountains, but his first ascent of Mt. Washington gave him anything but a favorable impression of the place as a winter residence.

The attempt to ascend the mountain through Tuckerman's Ravine; the swollen stream that compelled them to plunge into alders and scrub, and climb to the plateau south; the clouds in the ravine filled with rainbows of the most brilliant hues; the cold, fierce winds that swept the clouds and driven mist across the plateau; the wanderings, if perchance a path could be found; reaching the top of the mountain in a driving storm, with the temperature at 38° F. just as night closed around the summit: all these were so many vivid pictures in the mind.

In 1869, when employed in the geological survey of N. H., the speaker made the first really serious attempt, to occupy some high mountain summit in winter as a meteorological station.

It may naturally be asked why a geologist is especially interested in meteorology. Climate has been the great factor in all geological time. To get anything like a clear conception of the evolution of the earth, one must have some idea of the climatic conditions during the different periods of its developement. It seemed most desirable to occupy Mount Washington, but circumstances were such that Mount Moosilauke had to be taken instead. Almost every condition was unfavorable, but we gained experience that enabled me the following autumn to make such preparation on Mount Washington, that the expedition to that mountain was most successful. It was not, however, without the united effort of many individuals that it was a complete success. It was under obligations to very many people, but especially to Dr. J. E. Hilgard, who was largely instrumental in interesting the Signal Service in the expedition, so that they not only furnished three miles of insulated wire, but also sent a sergeant, who acted as telegraph operator and observer. This led to the place being made a permanent station of the Service.

It was a generally expressed opinion that no one could live upon the mountain during the winter, and it was with some misgivings that the speaker ascended the mountain on the 12th of Nov., 1870, for the winter, and stayed alone until the rest of the party<sup>1</sup> came; but what he supposed would be a stay of a few days, was lengthened into weeks.

<sup>1</sup>Mr. A. F. Clough came Nov. 30, and remained five weeks; came again in April, also in May.

Mr. Howard A. Kimball came Nov. 30; remained five weeks; came again in May.

Sergt. Theodore Smith came Dec. 4, and remained until May.

Prof. C. H. Hitchcock came Dec. 21, for a day, and again for a few days, in April.

Mr. S. A. Nelson came Dec. 21, and remained until the following summer.

Of the observations, those in regard to temperature are of more general interest.

Mean temperature, Jan.,	Mt. Washington,	6° F.
"	"	" Lunenburg, Vt., 16°
"	"	July, Mt. Washington, 43°
"	"	" Lunenburg, Vt., 68°
"	annual temperature, Mt. Washington,	25°
"	"	" Lunenburg, Vt., 41°

The lowest monthly mean temperature recorded, 1.3°, was reported by Sergt. Hearne, March, 1872. The mean for Boston the same month was 26°.

In any given cold period, the minimum temperature occurs on Mt. Washington twelve or twenty-four hours before it does in the valleys immediately adjacent. This fact, first shown during our occupation of the mountain, is one of practical importance. Although the cold wave generally comes on the tide of high barometer from the west, sometimes it does not reach the surface of the earth until it gets comparatively near the coast; then if there is no station on some high mountain, the extreme cold comes suddenly, without the least warning.

At no time, during our stay on the mountain, did we suffer from cold. When exposed, in extreme weather, one freezes so quickly that he does not feel the ordinary sensation of cold.

The precipitation in winter is chiefly in form of frost-work, and snow-ice; hence, for at least five months the amount has to be estimated, but during the other seven months, it can be measured with tolerable accuracy. In the Reports of the Chief Signal Officer, one year it is given as 82.96 in., another year, 47 in.

Before the station was established on Mt. Washington, very few had even heard of the great velocity of winds

at high altitudes. In the Report of the C. S. O. for 1874, it is stated that, Mar. 23rd, the wind had a velocity of 130 miles an hour, and continued near that enormous force for twenty-four hours. In the Monthly Weather Review for Jan., 1878, it says that remarkable wind-velocities were measured at Thatchers Island, of 70 miles an hour; at Cape Lookout, of 120; and at Mount Washington, of 186. Great velocities, at high altitudes, when storm areas extend over a large extent of country, are not so remarkable as that there should be great velocities in the upper currents of the air, when it is calm below. On the 4th of May, 1872, when there was a special series of observations being taken, there was a wind of 96 miles an hour on the summit, while at the base of the mountain, only 3667 ft. below the summit, there was a perfect calm. At the time, there was a heavy snow storm at the base, with nimbus clouds on the mountain. There have been many narrow escapes, when there were high winds accompanied by low temperature. The speaker once made the ascent of the mountain, and on reaching the summit, the wind was 70 miles per hour, and the temperature—17°. From Lizzie Bourne monument, to the summit, was a continuous struggle with wind and cold; with the wind to see which was the stronger; with the cold, to escape the sleep of death.

The Signal Service took the station, May 12th, 1871, and the following officers have since been in charge.

Sergt. Theodore Smith, from May 12th, to May 25th, 1871, when he was relieved.

Sergt. M. L. Hearne, from May 25th, 1871, to April 3rd, 1872.

Sergt. A. R. Thornett took charge of station until May 17th, when Sergt. Hearne was reassigned, but not being strong enough to endure the exposure, he was permanently relieved by Sergt. Thornett.



In May, 1872, a special series of observations were made on the summit, and at the base. Sergt. Thornett had charge of the station on the summit, and Sergt. Theodore Smith, the station at the base of the mountain.

In June, 1873, special observations were made at the base, elevation, 2,898 ft. ; at station 3 (Waumbeck Junction), elevation, 4,058 ft. ; station 2, elevation, 5,553 ft. ; summit, elevation, 6,285 ft. During May of the same year, there were special observations at the base and summit. All these observations were made under the general supervision of Sergt. Thornett.

Sergt. Thornett was relieved June 1st, 1874, and was succeeded by Sergt. Wm. Line, who had been his Senior Assistant since Sept. 17th, 1872.

Sergt. Line was relieved June 30th, 1877, and was succeeded by Sergt. O. S. M. Cone, who remained until the winter of 1877, when he was relieved by Private W. D. Murphy.

Private Murphy was relieved Aug., 1878, and was succeeded by Sergt. W. S. Jewell, who now has charge of the station.

After remarks from Mr. GEORGE D. PHIPPEN, of Salem, on the Flora of the mountain region, and of the cultivation of those gems of the vegetable kingdom which are beginning to be better known under the general name of "Alpine Plants," the meeting adjourned. It was a pleasant meeting, and an appropriate close to this eventful day.

On Friday morning, the party ascended Mt. Washington; on Saturday morning, left for Crawfords, spent the forenoon in visiting some of the places of note in that vicinity, and in the afternoon, took the cars for Salem, by the Eastern Railroad, arriving at 8.47 P. M.

# REGULAR MEETING, MONDAY, SEPTEMBER 16, 1878.

MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Daniel Mansfield Shepard was elected a resident member.



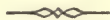
# THE 250TH ANNIVERSARY OF THE LANDING OF JOHN ENDICOTT, WEDNESDAY, SEPTEMBER 18TH, 1878.

THE 250th anniversary of the landing of John Endicott at Salem, was commemorated this day, under the auspices of the Essex Institute. The day was one of the loveliest of the season. There was no parade, and no procession. At eleven o'clock in the forenoon, the exercises were commenced in the Mechanic Hall; consisting of organ voluntary by Mr. B. J. Lang; reading of the Scriptures, and Prayer, by Rev. Robert C. Mills; original Hymn by Rev. Jones Very; poem by Rev. Charles T. Brooks; original ode by Rev. S. P. Hill; oration by Hon. Wm. C. Endicott; hymn "The breaking waves dashed high," Mrs. Hemans, rendered by Mrs. J. H. West; poem by Wm. W. Story, read by Prof. J. W. Churchill; one hundredth Psalm, sung by chorus and audience; benediction.

After the literary exercises, the invited guests and subscribers proceeded to Hamilton Hall, where an elegant lunch, provided by Mr. E. P. Cassell, was served. The floral decorations, consisted of elaborate centre pieces of choice cut flowers, from the green-houses of Mr. H. W. Putnam. The menu was an elegant piece of typography, and bore a fine line engraving of the old Governor. The

PRESIDENT presided. Rev. E. C. Bolles officiated as Toastmaster, and the divine blessing was invoked by Rev. Dr. Mills.

The PRESIDENT opened the after-dinner exercises, followed by Rev. E. C. Bolles, Toastmaster, Gov. A. H. Rice, Mayor H. K. Oliver, Hon. Robert C. Winthrop, Hon. Marshall P. Wilder, Rev. Dean Stanley, Hon. Wm. C. Endicott, Hon. Leverett Saltonstall, Prof. Benjamin Peirce, Hon. Geo. B. Loring, Rev. Fielder Israel, Joseph H. Choate, Esq., Benjamin H. Silsbee, Esq., Rev. Edward S. Atwood (omitted in the delivery, on account of the lateness of the hour). A full account is printed in the "Historical Collections" of the Institute, vol. XV.



#### FIELD MEETING AT IPSWICH, FRIDAY, OCTOBER 4, 1878.

THIS morning, a party consisting of some one hundred, members and friends of the Institute, assembled at the station of the Eastern Railroad in Salem, to take the train for Ipswich, and after a ride of some twenty minutes arrived at the place of destination. Messrs. Palmer, Kimball and other Ipswich friends were there, awaiting to conduct the party to the wharf, for an excursion in the Steamer "Carlotta," down the river to Plum Island, and the adjacent coast.

The sail on the river was very pleasant, the scenery diversified; passing by at first cultivated fields with scattered farm houses and buildings; afterwards rough and somewhat uneven land, and principally used for pasturage.

After tarrying some two hours in examining the peculiarities of the place, and the various points of interest,

returned to Ipswich, and found in the Seminary Hall where the baskets had been deposited, well spread tables for the midday lunch.

At 3 P. M. the afternoon session was held in the Manning school building. The PRESIDENT in the chair. Records read. The PRESIDENT in his opening remarks, spoke of some of the distinguished men in the various professions and callings who had, in the past, originated in old Ipswich, and had made their mark in the places of their adoption; of the previous meetings held in this town and the vicinity, and of the objects and work of the Institute. He said that at these meetings, subjects of historic interest, or the finding of specimens of Natural History, and suggestions arising thereupon, are introduced for discussion; at this time it is proposed to vary the programme, and to speak of some of the chemical products of the sea; salt water and what it contains, and he called upon Prof. ISAAC J. OSBUN of the State Normal School, Salem, to respond.

Prof. OSBUN, having placed upon the table several agents and reagents, also some apparatus to illustrate his remarks, said:—

No one can have failed to see in his rambles along the sea shore during the earlier part of the day, tiny, shining crystals covering the rocks where the sea water has been thrown up by the wind and dried away by the sun. Examine these crystals with the microscope, and they will be found to be wonderfully symmetrical in form, quite as much so as the plants and shells and other objects which you have collected to-day from the organic world of life. The power of crystalization is not a whit less wonderful, nor is its action in any respect better understood than the action of the mysterious forces exhibited by living beings.



The power of dissolving substances is a property common to all liquids. And what a curious property it is! Into this tall glass of water I pour a teaspoonful of salt, and it suddenly disappears as though it were totally annihilated. The water does not seem to have been changed in the least. And yet, we need not ask where this salt is, for, when I pour a few drops of water from the tall glass into this hot porcelain dish, pure water is driven off in the form of steam, and we find the salt beautifully crystalized around the edge of the dish.

If I were to evaporate one gallon of ordinary sea water to dryness, I should obtain about one-quarter of a pound of salt. This does not seem a great amount, but a barrel of ocean water will yield nine pounds of salt. If the ocean were but three feet deep and were then dried up, it would leave a layer of salt at the bottom one inch deep, while if it were three miles deep it would leave, if evaporated, a layer of salt 280 feet thick.

It has been estimated that the entire ocean contains three millions of cubic miles of salt. This would make a cube about 140 miles in each of its dimensions. It would just about cover the two states of New Hampshire and Vermont and would be about 150 miles high.

The question naturally arises, whence comes this great amount of salt? But when we see rivers of water flowing through regions of country filled with salt mines, it is easily answered. Some of these salt beds are very large. A single body of salt in Poland is 1200 miles long, twenty miles wide and one-fourth of a mile thick.

What is salt? The chemist will answer in this way. Pour upon some black oxide of manganese, a substance often used for making oxygen, some strong hydrochloric acid. A dense green gas will be given off, which has a very disagreeable and penetrating odor like chloride of lime, or bleaching powder. Because of its green color,

it is called chlorine, from the Greek word meaning green. Now this gas is one of the constituents of common salt. You will see it issuing from the vessel where the acid and black oxide of manganese were mixed. If I dip a clean platinum wire into this solution of common salt and then thrust it into this blue flame of the spirit lamp, the flame is at once colored a deep orange. You see at once that common salt must be the substance used to produce the yellow color in fireworks. In the neighborhood of the ocean the air becomes filled with fine particles of salt, which it deposits abundantly on all objects it comes near; on the leaves of trees, on the grass, on our houses and on our garments. As you see, I have but to brush my coat sleeve and the flame of the spirit lamp is colored a deep yellow. From this bottle, which is nearly filled with naphtha, I take a piece of dark gray substance which is soft as putty, and which, when cut, shows a bright metallic surface, which looks like freshly cut lead. I throw a piece of it upon water and you see it kindles and is quickly burned up. I find that this water, which was pure before, is now a weak solution of soda lye, such as is used for cleansing and for making hard soap. I dip the platinum wire into this solution and then thrust it into the flame, and you see again the orange colored light. A very minute portion of this substance when put into a flame can be seen by the help of the spectroscope. One fifty millionth of a grain is easily detected by means of this most delicate instrument. This substance is called sodium. It is the other constituent of common salt. These two elements, chlorine and sodium, give salt the name chloride of sodium. We thus see that common salt is a compound of a green gas with a bright glistening metal.

But there are many other substances in sea water. A

long time ago sponges applied to a goitered neck were found to be a somewhat efficient cure. Later, the ashes only of the sponges were used, and finally, an element obtained from these ashes, which was called iodine, from the beautiful violet color of its vapor. We are all more or less familiar with this substance in the form of tincture of iodine, which is a solution of iodine in alcohol, and also with the iodide of potassium, a very potent medicine. Iodine is now obtained from the ashes of sea-weeds which have absorbed it from the sea water, and have stored it away in their tissue. Besides common salt and sodium compounds, we find in sea water chlorides of potassium, calcium, magnesium; also the sulphates and carbonates of these metals, together with some of the bromides. All these salts make the water of the ocean heavier than common spring or fresh water, and hence its greater buoyant effect upon ships and all swimming bodies.

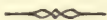
Sea water contains considerable gold in solution, and when we find that the ocean is estimated to contain about two million tons of silver, the question arises, could it not in some chemical way be profitably worked as a mine for the precious metals.

Mr. CHARLES DERBY, formerly of Salem, and for many years a resident of the Sandwich Islands, was present by invitation, and being called upon by the President, gave an interesting sketch of this group of islands; described the growth of the cocoa-nut, and other plants found growing luxuriantly in that locality.

The train for Salem being due, the meeting adjourned, after having unanimously adopted the following resolutions, proposed by Mr. WHIPPLE:—

*Resolved*, That the cordial thanks of the Essex Institute

are tendered to Dr. Charles H. Palmer, E. P. Kimball, Esq., and other gentlemen of Ipswich, for favors received ; to Mrs. Palmer, Miss Treadwell, and other ladies of Ipswich for the refreshing lunch so tastefully served ; to the gentlemen in charge of Seminary Hall, and the Manning school building, for the use of their rooms, and to Mr. Batchelder, who kindly furnished his barge for the members of the Institute.



REGULAR MEETING, MONDAY, OCT. 7, 1878.

PRESIDENT in the chair. Records read.

Mrs. G. G. Newhall of Salem, and Mr. J. H. Lefavour of Beverly, were elected resident members.



REGULAR MEETING, MONDAY, OCT. 21, 1878.

MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Rev. W. H. Meredith, and Mr. Charles H. Goss, both of Salem, were elected resident members.

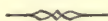
The PRESIDENT spoke of some bequests to the Institute, by the will of the late Miss Caroline R. Derby of Salem, consisting of two half length portraits by Copley, of Mr. and Mrs. Timothy Fitch ; and two portraits by C. Osgood, of Mr. and Mrs. E. Hersey Derby, the grandparents and parents of the testatrix ; also a collection of shells, some engravings, and a small lot of land on Derby street in Salem.

The pictures by Copley were painted between 1760 and 1767. They are in a good state of preservation and of life size. Timothy Fitch, a distinguished merchant of Boston, is represented seated by a table ; the costume



is a gold-laced coat and waist-coat, with a white wig and silk stockings. The companion picture, the wife of the above, is represented as sitting holding her work near a small table; the dress is a purplish pink satin with blue lining; behind is heavy green drapery. She was Eunice Browne, daughter of Col. Benjamin and Eunice (Turner) Browne of Salem; b. 13 Sept., 1731; m., 1st, 3 Sept., 1751, Capt. Ichabod Plaisted, jr., of Salem, who died 2 Jan., 1755, aged 34; m., 2dly, in 1760, Timothy Fitch of Boston. She died 27 June, 1799. This family of Browne was distinguished for wealth, liberality, and culture, and resided in Salem during the entire colonial and provincial periods of the history of Massachusetts.

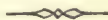
After the transaction of some business matters, the meeting adjourned.



#### REGULAR MEETING, MONDAY, NOV. 4, 1878.

MEETING this evening. Records read. Donations and correspondence announced.

Rev. C. C. Carpenter of Peabody, and Mr. B. F. Cummings of Salt Lake City, Utah, were elected members.



#### REGULAR MEETING, MONDAY, NOV. 18, 1878.

MEETING this evening. PRESIDENT in the chair. Records read.

Mr. E. Frank Balch of Salem, was elected a member.

The following paper was presented by Mr. J. S. Kingsley: "Notes on the Pacific Coast Crustacea," by Wm. N. Lockington.

Referred to the publication committee.

NOTES ON  
PACIFIC COAST CRUSTACEA.

---

BY W. N. LOCKINGTON.

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**Crangon nigricauda** *Stimpson*.

The identity of this species with the *C. vulgaris* of the Atlantic is suspected. Owen, and after him Dana, mentions it as *C. vulgaris*, and Kingsley, in his "List of the North American Caridea" (Bull. Essex Inst., Vol. 10, Nos. 4, 5, 6, p. 54) says of *C. nigricauda*, *C. vulgaris*, and *C. alaskensis* Lock. (Proc. Cal. Acad. Sci., 1876, p. 34), "I am inclined to consider the three species above as the same, but need larger series to decide."

In an unpublished MSS., written previous to the publication of the above list, I find the following notes: "*C. alaskensis* does not appear, on further examination, to be distinct. Minute black spots, like those scattered over the body and hands in the specimens described under this name, are also abundant in fresh specimens of *C. nigricauda* from San Francisco Bay, and sometimes persist in alcohol."

This species, therefore, is known to range along the Pacific coast from Alaska to San Diego, from which last locality were obtained specimens which, from the persistence in a dried state of a single black spot on each side of the tail, were described by me as *C. nigro-maculata* (Proc. Cal. Acad., loc. cit.).

**Crangon munitus** *Dana*, U. S. Ex. Exp. Crust., p. 536, pl. xxxiii, fig. 5.

A well-armed form obtained in Magdalena Bay, Lower Cal., by W. J. Fisher, and having, besides the infra-orbital, antennal, and hepatic spines, four spines upon the upper surface of the carapax, one on each side of the centre line, and two spines in the centre line, the posterior one placed far back, must, I believe, be referred to this species, which is thus proved to have a very considerable range, since Dana obtained it in Puget Sound. The rostrum is broader than usual in the genus, and the last abdominal segment is exceedingly compressed, the abdomen tapering rapidly at the fifth segment.

**Hippolyte taylori** Stimpson, Jour. Bost. Soc. Nat. Hist., vi, p. 500 ext. p. 60), 1857.

Three or four specimens from Magdalena Bay (Fisher) evidently belong to this species, having the peculiar rostrum with the second and third spines almost above the terminal one. The stout first pair of feet, and the second pair reaching to the tips of the maxillipeds, as described by Stimpson. Length of largest specimen  $1\frac{1}{10}$  inches.

**Hippolyte palpator** Owen, Zoology of the Voyage of the Blossom (Capt. Beechey), Crustacea, p. 89, pl. xxviii, f. 3, 1839. Stimpson, Proc. Cal. Acad., I, p. 89 (1856). *Ibid*, Jour. Bost. Soc., VI, p. 499 (1857).

*H. brevirostris* of Dana (U. S. Expl. Ex. Crust., I, p. 566, pl. xxxvi, f. 5) is not improbably a variety of this species (vid. Stimpson, l. c., p. 500). A single specimen from the bay of San Francisco in the Museum of the California Academy has but one tooth on the under side of the rostrum near the extremity, which is bifid and furnished with six teeth above. The maxillipeds are very long, about half as long as the entire body, and are spinulose internally at their tips. The basal joint of antennulæ has a spine, longer than the rostrum, at its base. The next joint has a smaller lateral spine and there is a sharp spine on the last joint of the peduncle, immediately over the centre of the third flagellum. The telson has two rows of fine, short, sharp spines, and two larger spines on the posterior margin. The penultimate abdominal segment has two teeth on each side of the posterior margin and the epimera of the two preceding segments are prolonged backward into a spine.

The chief difference between this and Owen's description of *H. palpator* is in the number of rostral teeth, but as these are variable in this genus I hesitate to describe it as new, preferring to refer it to one of the above forms.

Several specimens from Magdalena Bay agree with *H. palpator* in the length of external maxillipeds, but have the rostrum with four teeth above. *H. palpator* was found at Monterey by Capt. Beechey, in the Straits of De Fuca by the Exploring Expedition, and in San Francisco Bay (Stimpson).

*Hippolyte hemphillii*, described by myself (Proc. Cal. Acad., vii, p. 35 (1876)) from an imperfect dried specimen, is probably only a variety of the above species with an extremely short rostrum. This variety has been found at Magdalena Bay and San Diego. The rostrum is equal in length to the eyes; the terminal tooth is simple, the next smaller and considerably behind the terminal one.

**Hippolyte layi** Owen, l. c., p. 90, p. xxvii, f. 3.

Owen's description of this species is very brief and the rostrum only is figured. Two examples in the collection of the California Academy from the west coast of Alaska, north of Behring's Straits, agree so nearly with *H. layi* in the form of rostrum that I believe them identical. According to Owen the rostrum has ten spines above and four below, besides the terminal tooth. The specimens above referred to have, as in Owen's figure, a long lamellate ensiform rostrum, below well in front of the eyes are five nearly equal teeth, directed forwards, rostral tip long and sharp; above with seven unequally spaced teeth, the three posterior ones near together and on the carapax. Rostrum as long as or longer than the carapax, and has a thickened midrib from which the spines project as lamellæ of varying width. Antennal spine prominent. One specimen has a prominent spine upon the abdomen at the bend of its central segment. External maxillipeds comparatively short, and hidden entirely beneath the antennal scales. Basal joint of antennulæ spinose. Total length  $1\frac{3}{4}$  inches.

**Palæmon longipes.** Nov. sp.

Rostrum longer than antennal scale, reflexed towards extremity, armed with eight teeth above, and six below, without including the slender bifid terminal tooth. First teeth on upper margin, small, situated on the carapax, and separated from the following six, which are close together, eighth tooth nearer the tip than to the seventh tooth. Six lower teeth nearly equidistant, the first (beginning at the rear) immediately beneath the sixth of the upper series, the sixth beneath the eighth upper tooth. A spine on each side of the carapax, immediately above the antennal scale, and a second spine farther back and slightly below the first. Peduncle of antennulæ shorter than the antennal scale, basal joint armed with a strong spine externally, two external flagella united for some distance, the inner of the two very short, the outer very long, exceeding in length the internal flagella.

Antennal scale longer than peduncle of antennulæ, flagellum as long as the body from tip of rostrum to tail.

External maxillipeds, when extended, reaching somewhat beyond the antennal peduncle, slender, setose, especially on the terminal joint.

First pair of limbs slender, cylindrical, meros half as long again as ischium, carpus longer than meros, and three times as long as the manus; fingers blue, closely fitting, nearly as long as palmer portion of manus.

Second pair of legs exceedingly long and slender (in the male), ischium comparatively short and very slender; meros more than twice as long as ischium, and stouter; carpus exceeding the meros by two.



thirds; propodus slightly longer than carpus; fingers parallel, slightly deflected from the line of the palm, without teeth, their inner and outer surfaces densely pubescent.

Manus of the second pair minutely spinulose to the base, of the fingers; carpus and meros spinulose, the spinules larger on the under surface, where they form distinct longitudinal rows.

Posterior legs smooth, cylindrical, sparsely pubescent.

Terminal segment of abdomen with seven spinules, three at the tip the central one fixed, the lateral ones articulated, and two pairs situated farther forward, the anterior pair at about the middle of the length of the segment.

Three or four specimens were taken in Mulege River, on the West coast of the Gulf of California, by W. I. Fisher.

This species closely resembles *P. dasydactylus* Streets (Proc. Phil. Acad., 1871, 225) which is quoted by Kingsley, in his List of North American Carideæ (Bull. Essex Inst., Vol. X, Nos. 4, 5, 6) as a synonym of *P. forceps* M. Edward. The principal differences traceable are in the proportions of the joints of the first pair of legs, the manus in the present species being shorter than in *P. dasydactylus*, in the greater length of the articulations of the second pair in this species, as compared with their thickness; and in the spines of the terminal abdominal segment, which are only five in Dr. Streets' species.

The differences are so small, and the resemblances so great, as to suggest the possibility of actual near relationship; and it is not improbable that in this form we meet with the descendants of such of the Atlantic *P. forceps* as penetrated into the Pacific when the oceans were connected at what is now the Isthmus of Panama.

The female resembles the male, except in the second pair of limbs, which are much smaller, smooth, shorter, and more slender, and have the proportions of the joints reversed, the manus shorter than the carpus, and the latter shorter than the meros.

The specimens were obtained in August, and the females were loaded with ova.

The teeth on the upper side of the rostrum vary somewhat, the tip, which is blunt in one specimen, is bidd in another, and one of the males has only eight teeth on the upper edge.

Following are the dimensions of a male and female:—

	♂	♀
Total length, . . . . .	105 millims.	82 millims.
Length of carapax, including rostrum, .	51 "	37 "
" " flagellum of antennæ, . . .	110 "	95 "
" " outer flagellum of antennulæ, .	90 "	— "
" " first pair of legs, . . . . .	39 "	25 "

	♂	♀
Length of second pair of legs, . . .	167 millims.	89 millims.
" " third pair of legs, . . .	55 "	— "
" " manus of first pair, . . .	60 "	10 "
" " carpus " . . .	55 "	13 "
" " meros " . . .	35 "	16 "

Notwithstanding the great difference in the proportions of the joints of the second pair of limbs in the males and females, I think there is no doubt they belong to the same species, since they were taken on the same occasion, and in other respects resemble each other closely.

In every point except those mentioned above, my specimens agree with Streets' description and figure, yet they are from the western shore of the Gulf of California, while his specimens were from Coatzoalios River, Isthmus of Tehuantepec, and the species has always been known as an Atlantic one. Yet the differences are so small as to be, in my opinion, only varietal, and a parallel case occurs in the genus *Alpheus*, where *A. heterochelis* and *A. minus* are common to both the Atlantic and Pacific shores.

***Pontonia margarita*** *S. I. Smith*, Am. Naturalist, 1869, vol. III, p. 245, foot note.

This species, originally described from individuals collected at Panama, was taken in considerable numbers at Port Escendido, Mulege Bay and Gulf of California, by W. I. Fisher, in August, 1876, at which date the females were with spawn.

The color after a month in spirits, was a light rose tint, with occasionally some dark markings upon the hands.

The specimens agree in every respect with Smith's description, and inhabited the same shell, viz., *Margaritophora fimbriata*.

### ***Pontonia pinnæ* nov. sp.**

Body slightly depressed; carapax smooth, rostrum elongate-triangular, deflected, the tip lying between the base of the antennulæ; antennal spine prominent.

Peduncles of eyes short, broad ovate, cornea much narrower than the peduncle.

Peduncle of antennulæ exceeding the rostrum by the length of its distal joint, flagella not longer than the two last joints of the peduncle subequal, the outer stouter than the inner.

Antennal scale broad, as long as antennular peduncle, antennal flagellum extending backwards to about the middle of the carapax.

First pair of limbs slender, carpus and meros sub-equal, propodus about two thirds the length of carpus, dactyli about equal to palmar portion.

Second pair greatly developed, equal to the body in the female, and exceeding it in the male; propodus stout, dactyli one half as long as the palmar portion, pollex with two large obtuse teeth on its inner border, and a slightly hooked point, dactylus slender, with a large sharp-pointed, triangular, compressed tooth in the middle of its length, closely fitting between the teeth of the pollex.

Dactyli of hinder four pairs bi-unguiculate.

Three last segments of pleon compressed, a spine on each side of the posterior border of the penultimate segment.

Total length of a well-grown specimen from tip of rostrum to end of abdomen, about 34 millims; length of manus of adult male, 17 millims; ditto of a well-grown female 13 millims.

The females are similar to the males, but the manus of the second pair is somewhat shorter.

Several specimens were taken from the interior of the shell of the common *Pinna*, of the Gulf of California; localities: Angelas Bay, Mulege Bay, San José Island. They were collected in the months of July and August, at which date the females were loaded with eggs.

From *P. margarita* S. I. Smith, this species may readily be distinguished by the much greater development of the manus of the second pair. From M. Edwards' description of *P. tyrrhena* (Hist. Nat. des Crust., Vol. II, p: 361), which inhabits the *Pinna* of the Mediterranean, this species differs in lacking the tooth upon the rostrum.

### ***Sicyonia penicillata* n. s.**

Rostrum deep, shorter than peduncles of eyes, with four spines above, one forming the tip, the next immediately above and slightly posterior to it, the third midway between the second and fourth, which is upon the carapax. Carina of rostrum extending backwards the whole length of the carapax; developing a strong spine, directed forwards, just anterior to the centre of the carapax, and a stronger similar spine near its posterior border.

Central carina higher behind the former of these spines, curving upwards to the posterior spine, then downwards till it disappears on the posterior border of the carapax.

Spines of rostrum preceded by a few hairs, the central spine of carapax by quite a mane of hairs, and the posterior spine with a similar mane.

A spine on the exterior orbital margin, and a second posterior to it, on the hepatic region.

First segment of pleon with a triangular spine, behind which a low central carina is continued to the extremity of the sixth segment of the pleon, rising into a spine on the posterior margin of the fifth and sixth segments.

Ophthalmic peduncle shorter than the basal joint of antennulæ, cornea large, broader than the peduncle, its width about equal to the length of the visible portion of the latter.

Basal joint of antennular peduncle broad, armed with two sharp lateral spines, one behind the other, in a line with the lateral spines of the carapax; flagella of antennulæ scarcely as long as the two distal joints of the peduncle, the joints much shorter than broad.

Spine of antennal scale extending slightly beyond the antennular peduncle, the squamose portion broad, not longer than the spinose portion.

Peduncle of antennæ slightly shorter than that of antennulæ, its terminal joint setose on its internal margin, flagellum much shorter than the body, its articulations broader than long, especially the proximal portion, where they are depressed and margined with seta internally and externally.

Outer maxillipeds extending beyond antennal peduncle, the propodus margined internally with long setæ.

Meros, carpus and propodus of first pair of legs equal in length, all the joints of second pair longer, but the carpus longer than the meros; in the third pair, which extends beyond the outer maxillipeds when straightened, all the joints are longer than in the second pair, and the slender carpus almost twice the length of the propodus.

Propodi of three first pairs similar, that of the third pair somewhat longest, fingers parallel, equal to the palmer portion in the first and second pairs, but shorter in the third.

Fifth pair longer than the fourth, dactyli laminate.

A spine at the tip of the outer caudal appendage externally.

Length of a large specimen, . . . . .  $3\frac{1}{2}''$

Length of carapax, . . . . .  $0.35''$

Length of outer antennæ, . . . . .  $1.85''$

Dredged from a depth of 14 fathoms, in Bolinas Bay, Lower California; also obtained in Angeles Bay, Gulf of California. (W. J. Fisher.)

Color after two weeks exposure to alcohol, bright red; with a dark red-brown ocellated spot on each side of the carapax. Antennæ bluish.

A longer exposure to alcohol has bleached the body, but the antennæ still show traces of blue, and the spots on the carapax, though obsolete in one specimen, remain dark and conspicuous in another.

This form resembles *S. carinata* Dana (U. S. Ex. Exp. Crust., I, p. 602), but the rostrum is more prominent.



A LIST OF THE  
BIRDS OF THE HUDSON HIGHLANDS,  
WITH ANNOTATIONS.

BY EDGAR A. MEARNS.

ABOUT six years ago, in 1872, I first formed the plan of working up the ornithology of this region as thoroughly as possible. Since that time I have been constantly at work in the field at all seasons of the year, except during the summer months, when other business has almost wholly interrupted my ornithological work. This is to be regretted, for, otherwise, I might have observed the breeding-habits of a greater number of our rarer summer residents; and probably should have secured some of the southern forms that occasionally wander northward, during the hot months of summer.

My residence is, for such a purpose, very happily located at Highland Falls, New York; affording, from its position, an excellent point for ornithological observation. It is "situated on the right [west] bank of the Hudson River, fifty-one miles above New York City, in the midst of a range of the Alleghany Mountains known as the Highlands. Latitude,  $41^{\circ} 23'$  north; longitude,  $3^{\circ} 3'$  east."<sup>1</sup>

The surface of the country is exceedingly varied, abounding in high mountains with enormous perpendicular cliffs, while large streams flow in the valleys. Lakes, ponds, and brooks are very numerous, affording, as they do, favorite resorts for both migrating and stationary birds. The numerous islands of the Hudson afford choice resting places for migrating flocks of small birds, which prefer to follow, on their long and fatiguing vernal and autumnal journeyings, the course of the river. The whole region is wild, and sparsely inhabited.

I have prosecuted my researches, on foot, in the three adjacent counties, bordering the Hudson on either side—Orange, Rockland, and Ulster, on the west; and Dutchess, Putnam, and Westchester, on

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<sup>1</sup>The situation, as above quoted, is from "Circular No. 8, Surgeon General's Office," and refers to the West Point Military Academy, a mile north of Highland Falls.

the east side. But most of my investigations and collections have been made along the river-banks, near my residence, or, as the title expresses it, in the "Highlands,"—a section of the river-valley extending north from Kidd's Point, or Caldwell's Landing, for a distance of twenty miles.

The mountain slopes are thickly wooded in most places, but in the rocky soil the deciduous trees seldom grow to a very large size. The river slopes are, for the most part, thickly clothed with coniferous trees, affording food and shelter for the winter residents. The following list of *Coniferæ* belongs to our flora:—

*Pinus rigida*, Miller. Pitch Pine.

*Pinus strobus*, Linné. White Pine.

*Abies canadensis*, Michx. Hemlock.

*Thuja occidentalis*, Linné. American Arbor Vitæ.

*Juniperus communis*, Linné. Common Juniper.

*Juniperus virginiana*, Linné. Red Cedar.

*Taxus baccata* var. *canadensis*. American Yew; Ground Hemlock.

The Hudson River constitutes a natural channel, through which the tide of semi-annual migration always pours with more than ordinary vigor; and it also affords an avenue of approach for the numerous aquatic species that visit us during the migrations, or remain here during the summer. Hence many of the marine species visit us during their migrations.

Zoologists are familiar with the fact, that rivers are very important factors in limiting or extending different faunæ. It is known that a given avi-fauna may be prolonged by them in streaks. This is a demonstrable fact, and is equally applicable to other classes of animals, and even to the flora. Of the mammals, the common Opossum (*Didelphys virginiana*) may be cited as illustrating this influence. This species finds its northernmost extension along the west bank of the Hudson. It also illustrates the restrictionary effect of rivers. The Hudson interposes a barrier to the progress of the species eastward, and, accordingly, it has rarely—never to my knowledge—been observed on the east bank of the river, though it is not uncommon upon the opposite side; occurring at least as far up as Newburgh. Among the plants, I shall cite but a single species, the common persimmon (*Diospyros virginiana*), which has also crept up the Hudson to a considerable distance from the general northern boundary of its habitat. DeKay wrote the following, in confirmation of the above-mentioned facts, as long ago as 1844: "On the other hand, the Hudson River appears to form a natural geographical limit to the extension of some species, at least in any considerable numbers. Thus, the Opossum of the South rarely, if ever, outstrips this boundary; among the reptiles,

the Chain Snake and Brown Swift, and the Buzzard and many other species among the birds."<sup>2</sup> C. Hart Merriam, in his "Review of the Birds of Connecticut,"<sup>3</sup> has clearly brought out the fact, previously alluded to by Mr. H. A. Purdy,<sup>4</sup> that the avi-fauna of Connecticut, exhibits a marked Carolinian tinge along its southern border. Merriam adds, furthermore, that this tinge is especially well-marked about the mouth, and "runs up the valley of the Connecticut River, extending completely through the State, and even into Massachusetts." The valley of the Connecticut exhibits, in this respect, precisely similar conditions to those presented by the Hudson River Valley.

Prof. J. A. Allen wrote,<sup>5</sup> in 1871, "On the Atlantic coast this fauna [Carolinian] includes Long Island and a small portion of Southeastern New York." He also enumerated thirty-two species as being in a general way "limited in their northern range" by this fauna, adding that a few of them occur also "as stragglers in the Alleghanian Fauna." Mr. Eugene P. Bicknell has recently published an excellent paper, in the "Bulletin of the Nuttall Ornithological Club" (Vol. III, No. 3, July, 1878), entitled "Evidences of the Carolinian Fauna in the Lower Hudson Valley. Principally from observations taken at Riverdale, N. Y." In this article, the author entirely confirms Mr. Allen's views concerning the Carolinian Fauna in Southeastern New York; proving that the lower Hudson, about Riverdale (near New York City), is furnished with a considerable number of species, many of them quite common summer residents, which belong strictly to that division of fauna, known to ornithologists as the Carolinian. Mr. Bicknell remarks:—

"The boundaries of faunal areas are usually of an extremely irregular nature, and in their territorial relations contiguous faunæ often present a series of mutual interpenetrations, the apparent invasion of one province of an adjoining district of course being coincident with an opposite extension or penetration of the invaded territory. Thus from near the northeastern boundary of the Carolinian Fauna two main branches emanate,—one striking up into the valley of the Hudson; the other extending along the Connecticut coast and into the Connecticut valley, through which reaching the Massachusetts border. The relations between these two tributaries at their junction with the main body of the fauna to which they belong, or their consolidation before reaching that point, is at present but very superficially understood; but from what knowledge we have in the matter it would

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<sup>2</sup> Zoology of New York, Part I, Mammalia, Preface, p. 10, 1844.

<sup>3</sup> Transactions of the Connecticut Academy, Vol. IV, pp. 1 to 150, 1877.

<sup>4</sup> Am. Nat., Vol. VII, No. 11, p. 693, Nov., 1873.

<sup>5</sup> Bull. Mus. Comp. Zool., Vol. II, pp. 393, 394, April, 1871.



appear that their interception occurred somewhere near the mouth of the Hudson, thus including New York city and vicinity in the angle formed by their divergence. The northern limit of the Hudson River branch is as yet undetermined."

Then follows an enumeration of the species, belonging to this category, which Mr. Bicknell has discovered in the neighborhood of Riverdale, which are as follows: *Mimus polyglottus* (Mocking Bird); *Lophophanes bicolor* (Tufted Titmouse); *Thryothorus ludovicianus* (Carolina Wren); *Helmitherus vermivorus* (Worm-eating Warbler); *Helminthophaga pinus* (Blue-winged Yellow Warbler); *Helminthophaga chrysop-tera* (Golden-winged Warbler); *Oporornis formosus* (Kentucky Warbler); *Myiodiotes mitratus* (Hooded Warbler); *Stelgidopteryx serripennis* (Rough-winged Swallow); *Cardinalis virginianus* (Cardinal Red-bird); *Corvus ossifragus* (Fish Crow, seen, but not captured); *Empidonax acadicus* (Acadian Flycatcher); and *Strix flammea* (Barn Owl, seen, in New York city, by Mr. H. B. Bailey).

That this Carolinian tinge extends for a considerable distance up the Hudson, not only to the Highlands, but through, and a little beyond, I shall be able to show in the following list. Unquestionably, we owe to the Hudson River the possession, as abundant summer residents, of such species as *Helmitherus vermivorus*, *Helminthophaga pinus*, *Siurus motacilla*, *Icteria virens*, and several other species, which accession gives to our avi-fauna its Carolinian tinge; it belonging, otherwise, to the division of country known as the Alleghanian Fauna.

To map out the exact dividing lines of the different faunal areas, is one of the most important and attractive branches of zoological research; while the labor of determining the precise range of habitat for each species, is, indeed, an arduous task, and one that, from its importance, must claim a large share of the attention of our ornithologists for many years to come.

The present list of our birds is intended to embrace only those species which have actually been captured within the described limits; or those which have been seen under circumstances which admit of not the slightest doubt of the accuracy of the observations. To this enumeration is appended a separate list of the species whose occurrence is probable—especially such as have been observed in contiguous districts.

It seems unnecessary to discuss, at any great length, the problem of the extinction of a number of species that were formerly abundant; but are not now to be found at all within our limits. I will, therefore, simply mention that several species have only disappeared within the past few years, while others have long since passed away. Among the former, were two of our most prized game birds, the Wild Turkey (*Meleagris gallopavo*), and the Pinnated Grouse or Prairie Chicken



(*Cupidonia cupido*), both of which were given by DeKay, in 1844, as still occurring in New York. Of the Wild Turkey he wrote:<sup>6</sup> they "as I am well informed, are now only found in the counties of Sullivan, Rockland, Orange,<sup>7</sup> Alleghany and Cattaraugus." Of the Prairie Chicken:<sup>8</sup> "A few are still said to linger about Orange county in this State." Among the latter class may be mentioned the Great White Pelican (*Pelecanus trachyrhynchus*), which was formerly numerous on the Hudson, and other rivers and lakes in this State.

I take this means of expressing my warm gratitude to all who have assisted in this work. To the following gentlemen my thanks are especially due: Mr. Eugene P. Bicknell, of Riverdale; Mr. C. H. Simpson, of Peekskill; Dr. A. K. Fisher, of Sing Sing; Mr. Peter de Nottbeck, of Fishkill Landing; Mr. Josh Ward, of Cornwall, for many valuable specimens and much information concerning our aquatic birds; and to Prof. J. A. Allen and Dr. C. Hart Merriam for their kind assistance in various ways. To Mr. Wm. Church Osborn, of Garrisons, I am particularly indebted for much valuable material; and for the use of the MSS. notes of his brother, my late lamented friend and fellow laborer in this field, Frederic S. Osborn.

It has been thought worth while to introduce, in condensed form, the results of extensive tables of measurements of more than 1,900 specimens, that I have collected in the Highlands. The average dimensions of each species will be given, and any remarkable variations noted.

*A. List of all the species known to occur in the Hudson Highlands; giving the times of occurrence and their relative abundance, with notes on the habits.*

#### Family, **TURDIDÆ.**

**1. *Turdus migratorius*, Linné.** ROBIN. An abundant summer, and less common, winter resident; breeds abundantly.

The Robins usually place their nests on trees, but this is by no means the situation always chosen. I have noticed them in various other locations. One was placed on the top of a stump, at an elevation of fifteen feet; another on a stump chopped close to the ground. About civilization, the nests are often placed on the rail-fences. Beams in barns and dilapidated out-buildings often furnish them with sheltered and comfortable places, wherein to establish house-keeping; so comfortable, in fact, that they are loath to leave them, and so return every spring to their old quarters. In some instances the identical

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<sup>6</sup> Zoology of New York, Part II, p. 200, 1844.

<sup>7</sup> Italics my own.

<sup>8</sup> Same work, p. 206.

site of the last summer's nest is selected for the new one, but, as their economy and habits of cleanliness do not permit them to occupy the same nest a second season, the old one is thrown down, and a new one built in its place. This, however, is often impossible, for the Robins, though less artistic architects than some other birds, build such substantial nests, that their masonry is capable of withstanding the winds and storms of several seasons, after the builders are through with them; hence it is sometimes impossible for the birds to make much impression on the hardened walls, and, in such cases, if no equally pleasant situation is at hand, a second nest is constructed on top of the first, making a two-storied residence. It sometimes happens that a third structure is deposited above that, on the succeeding season, though I have known of but one such instance. I once saw a nest that was built on a brace, or ornamental support, of the building at which toll is collected, on the American side of the Niagara suspension bridge, in a much frequented situation; attracting not a little attention from the numerous visitors. If courteously received, Robins will become quite familiar and friendly. On more than one occasion, I have known them to build upon a piece of timber, just above the door of a dwelling, beneath the porch, where, in one instance, a number of noisy children were frequently playing beneath. Lieut. Willis Wittich, of Fort Klamath, Oregon, writes me that the Robins there build their nests on the prairies, on the ground, or, if in the timber, low down. I have seen an approach to these habits in our eastern bird. I was shown (by my friend, Mr. Wm. Church Osborn, to whom I am indebted for many valuable observations noted further on) a nest built on the ground, in a hollow in the side of a sloping bank by the roadside. I discovered another nest that was placed in a tangled thicket of matted vines and bushes, quite close to the ground.

All of the nesting sites mentioned above are unusual, and only go to show how great an amount of variation is observable in the habits of any species, when a sufficient number of individuals is examined; of course these minor differences in traits or habits are greatly enhanced if our observations be made to extend over widely differing areas of the bird's habitat.

Robins commence laying early in May. Five nests were found, containing five, three, four, one, and four eggs, respectively, on May 11th, 1872; in 1873, the first nest seen contained a single egg on May 6th; on May 4th, 1874, the first nest was discovered, containing four eggs. In warm, early seasons, the birds begin to nest at an earlier period than usual; thus, during the remarkably advanced spring of 1878, I observed that a pair of Robins were engaged in constructing a nest as early as the 15th of April, and, on the 27th of the same month, a nest was found, containing the full complement (four) of eggs.

Among the Robin's worst enemies may be ranked the Red Squirrels (*Sciurus hudsonius*), for, though their young are subject to the attacks of Crows, Jays, and particularly to the ravages of the Black Snake (*Bascanion constrictor*), yet none of these enemies inflict as much injury as the Squirrels, because, not only do they seek out and devour the eggs, but the young are also eaten; and their numbers are in great excess. But the Robins are very brave in defending their progeny, and endless are the battles that take place between them and the Squirrels. One of these tragedies took place right in front of my house, on the 6th of June, 1873. Within my recollection no year has elapsed but that a pair of robins nested in a certain evergreen (*Abies excelsa*), close to my residence. On the morning in question, a Red Squirrel came a considerable distance out of the woods, ascended to this nest, and would have destroyed all the young ones, had not the parent returned just at the critical moment. The enraged bird dashed furiously at the marauder, assaulting it in such a manner as to dash it to the ground, where the struggle was renewed, and kept up, till the Squirrel reached the trunk of a maple-tree, and quickly disappeared among the branches, when the Robin returned, triumphant, to resume the care of her little ones, all but one of which were safe.

In early spring they feed largely upon earth worms, and may be seen standing erect upon the lawn, listening intently for their prey. On the government reservation, at West Point, they are abundant. Often during drills, they drop down upon the velvety grass of the parade ground, where, from their erect posture and bright colored breasts, they are exactly in keeping with the military aspect of their surroundings.

They are rather scarce winter residents throughout the Hudson Valley; occurring at least as far north as the northern limit of the red cedar (*Juniperus virginiana*), perhaps much farther. In the Highlands, sizable flocks generally remain all winter amongst the cedars, in sheltered localities, near the Hudson River. Their abundance does not seem to depend upon the severity of the winter, for they are quite as numerous in cold, as in warm, seasons. Very few were seen during the winter of 1877-78, which was the mildest I have ever experienced. The wintering birds affect only certain favorite spots, where they subsist mainly upon the berries of the sumach (*Rhus typhina*) and red cedar. I have seen quite a number of partial albinos. When domesticated, they are especially subject to variations in color. A Scotch cobbler, in Highland Falls, had a very old Robin, which in old age became nearly white. My gardener's child has had one for several years; before its last moult its colors were very dark and peculiar, but since its moult it has become partially white.

*Dimensions.*—Average measurements of nine specimens: length,



10.03; stretch of wings, 15.95; wing, 4.96; tail, 3.87; bill (culmen), .84; from anterior margin of nostril, .53; tarsus, 1.26. The winter residents give larger measurements than the summer residents. A very fine male, shot March 3rd, 1875, measured as follows: length, 10.49; stretch, 16.32; wing, 5.81; tail, 4.12. Another remarkably fine male, shot April 30th, 1878, measures: length, 10.10; stretch, 16.25; wing, .5; tail, 3.05. These specimens represent the extremes of both seasons.

**2. *Turdus mustelinus*, Gmelin.** WOOD THRUSH. A common summer resident; breeds abundantly. Arrives about May 10th (May 13, 1874; 10, 1875; 8, 1876; 7, 1877; April 30, 1878).

The Wood Thrush is our best songster. We have no other bird whose song can be compared with its. It is sometimes found in gardens, about residences, and again, it is found in the deepest solitudes of the forest, its manners differing proportionately to its different habitations; but in general it is gentle and unsuspicious if not disturbed. It commences to lay quite soon after its arrival. A nest was found containing three eggs on May 17th, 1873, and on May 11th, 1878, several nearly completed nests were examined, besides one containing an egg. It stays until the last of September (September 25, 1874; October 5, 1875; September 20, 1876; 30, 1878).

*Dimensions.*—Average measurements of six specimens: length, 8.29; stretch, 13.70; wing, 4.44; tail, 2.92.

**3. *Turdus pallasi*, Cabanis.** HERMIT THRUSH. Very abundant through the migrations. A few sometimes winter. Arrives from the South about the 1st of April (March 26, 1872; April 8, 1873; 14, 1874; 2, 1875; 21, 1876 [not seen again till May 2]; 22, 1877; 15, 1878). It remains here until sometime in May (April 30, 1875; May 3, 1876; 12, 1877; April 26, 1878). Returning, in autumn, it arrives from the North early in October (15, 1876; 7, 1877), remaining till about the 1st of November (9, 1874; October 28 [or later], 1876).

The Hermit Thrushes remained here throughout the severe winter of 1874-75, when birds of the Canadian Fauna, such as the Pine Grosbeak (*Pinicola enucleator*), the two Crossbills (*Loxia curvirostra*, var. *americana*, and *L. leucoptera*), and the Lesser Redpolls (*Aegithus linaria*) were very numerous. They inhabited the cedar groves, near the river, in company with the Purple Finch (*Carpodacus purpurens*). They were always quite silent, except for the utterance of an occasional low *chuck*; this note, in autumn, is sometimes so loudly repeated as to remind one of the Blackbird's. A few of these wintering birds were seen as late as March 20th, and the regular migrants appeared April 2nd. They have been observed in winter at several places lower down the Hudson.<sup>9</sup> Except the Robins, they are the

<sup>9</sup> See article in Bulletin of the Nuttall Club, Vol. IV, p. 34, January, 1879.



hardest of their family, but the following extract from my note book will show that, by a premature migration northward, they are sometimes exposed to sudden inclemency of weather, and suffer severely:—

"April 28th, 1874. Last night we had a heavy fall of snow and sleet. The Hermit Thrushes, Blackbirds, etc., have become so reduced by hunger and cold, that they come quite freely into the house and stable. A number of species were captured in the kitchen and barn, as follows: *Turdus pallasi*, *Spizella socialis*, *S. monticola*, *Junco hyemalis*, *Melospiza melodia*, and *Agelaius phoeniceus*."

Though not a timid bird, the Hermit Thrush generally selects solitary abodes. If these are invaded by man, its actions betoken more of curiosity, than alarm. Late in October, 1877, while walking from here to New York city, in company with my friend, Mr. I. F. Lockwood, we were induced by a sudden deluge of rain to seek shelter beneath some hemlocks, near Tarrytown; there we were highly entertained by the quaint manners of a Hermit, that had chosen that dimly lighted spot for its residence, and that seemed by no means pleased to make our acquaintance; showing its resentment at our ill-mannered intrusion upon its privacy by repeating, in a complaining tone, its single "chuck"; occasionally alighting close beside us, it would give a sharp, almost spiteful emphasis to its utterance; then it would fly away, and return again hopping on the ground, occasionally stopping short, cocking its head sidewise, and ogling us with such a ludicrous expression, that we were induced in a measure to forget our disagreeable situation, and indulged in a hearty laugh.

*Dimensions*.—Average measurements of fourteen specimens: length, 7·17; stretch, 11·45; wing, 3·56; tail, 2·74.

**4. *Turdus swainsoni*, Cabanis.** SWAINSON'S THRUSH. Very common during the migrations. It is met with in May (May 11 to 31, 1875; 9 to 28, 1876; 15, 1877; 10 to 27, 1878), and in the fall from September 12th to October 19th (1876).

In spring they are very abundant in the woods and orchards, uttering a note that sounds like the bursting of an air bubble on rising to the surface of a fluid. In autumn they are found in deep woodlands, feeding, in company with many other birds, on the berries of the sour gum (*Nyssa multiflora*) and dog-wood (*Cornus florida*).

*Dimensions*.—Average measurements of thirteen specimens: length, 7·17; stretch, 12·11; wing, 3·93; tail, 2·76; bill (culmen), ·50; gape, ·79; tarsus, 1·17; middle toe, ·62; its claw, ·22.

**4a. *Turdus swainsoni*, var. *aliciæ* (Baird).** GRAY-CHEEKED THRUSH. Abundant with *T. swainsoni* during the migrations. It appears to arrive later, both in spring and fall, than that species. Found during the latter half of May, and from September 23rd (1878) to October 19th (1876).

The only note I have heard from this species, in spring, is a peculiar

bubble-bursting sound, like that produced by the Olive-backed Thrush; but in the fall they utter a low note resembling the common cry of the Brown Creeper. In autumn, they are found inhabiting the thickest woods, where they feed upon the berries of the sour gum, or "pepperidge" (*Nyssa multiflora*), dogwood (*Cornus florida*), and the frost grape (*Vitis cordifolia*); but they are especially fond of the ripe berries of the common pokeweed or pigeon-berry (*Phytolacca decandra*), upon which they soon grow very fat, as do the Robins. They are very shy, and, when frightened, fly a long distance before alighting, when they remain perfectly quiet for some time, rarely taking another flight; for this reason they are very hard to discover, so that a woods may sometimes abound with them, when none are visible to an ordinary observer. When perched, they assume a very erect posture, and present an appearance of alert wariness corresponding to their wild habits.

They are generally quite readily distinguishable from *T. swainsoni*, though by exactly what characters it is hard to explain, when the markings are not distinguishable.

*Dimensions*.—Average measurements of fourteen specimens: length, 7.58; stretch, 12.70; wing, 4.09; tail, 2.96; bill (culmen), .55; gape, .82; tarsus, 1.25; middle toe, .68; its claw, .25.

**5. *Turdus fuscescens*, Stephens.** TAWNY THRUSH; WILSON'S THRUSH. A rather scarce summer resident; breeds. Arrives early (May 5, 1876; 15, 1877; 8, 1878).

Wilson's Thrush is only common here during the spring migrations. It is occasionally seen during the breeding season, but not abundantly. A pair has nested for several successive seasons, on Constitution Island, close to the house of the Misses Warner, where they are very welcome guests. Miss Warner described its song to me as one of surpassing sweetness.

On their first arrival from the South they are very shy, staying in the thickest under-growth in the deep woods; but soon they come flocking familiarly about the house, and for a time the blossoming orchards are filled with them. After several weeks, however, they nearly all move further north, a few, only, remaining to breed, removing to the darkest solitudes of the woods, in single pairs. Then I have found them shy, and their nests I have failed to discover. Lower down the Hudson, this species is more abundant in summer, and breeds very commonly.

*Dimensions*.—Average measurements of five specimens: length, 7.52; stretch, 11.95; wing, 3.84; tail, 2.87; bill (culmen), .53; gape, .85; tarsus, 1.17; middle toe, .68; its claw, .22.

**6. *Mimus carolinensis*, (Linné).** CAT-BIRD. A very common summer resident; breeds. Arrives early in May (May 4, 1872; 10,

1874; 9, 1875; 8, 1876; 11, 1877; April 27, 1878), departing late in October (October 16, 1874).

Immediately after their arrival, they are heard singing in thickets, and soon they commence nesting. I found them with eggs—one nest containing two and another four eggs—as early as May 15th, 1878. Like the rest of the family, they are fond of most kinds of berries, of which their food mainly consists, in autumn. Their nests are usually placed in bushy thickets, and are loosely built of sticks and whatever soft lining material is available. I have seen a handsomely embroidered handkerchief, and a lady's escaped "frizzes," thus turned to account by them. But their eggs are of a deep emerald-green, uniform in color, the most beautiful that we have.

*Dimensions.*—Average measurements of four specimens: length, 8·94; stretch, 11·59; wing, 3·54; tail, 3·65; bill from nostril, ·48; tarsus, 1·10.

**7. Harporhynchus rufus, (Linné).** BROWN THRASHER. An abundant summer resident; breeds. Arrives the first of May (April 26, 1872; May 8, 1873; 5, 1874; April 30, 1875; 30, 1876; May 1, 1877; April 27, 1878), departing in October (October 8, 1876; 9, 1878).

Its presence is first announced, in spring, by its loud, sweet song, forcibly reminding one that spring has really come, for spring can scarcely be said to have begun till the trees commence to unfold their blossoms; and it is followed in a few days by the sweetest notes we ever hear—those of the Wood Thrush.

The Brown Thrashers seem to be mated immediately after their arrival from the South, and they soon begin to build their nests. So joyous are they at this season, that their song is heard all day long. Even when engaged in the matter-of-fact occupations and duties that pertain to setting up housekeeping, when bustling and scratching amongst the leaves and rubbish, for the materials for their nests, they are observed to pause, at intervals, to sing. But they are best heard in the early morning, at daybreak; then the males mount to the topmost bough of some tree, surrounded by the brushwood that they inhabit, and, with tail dropped and wings slightly drooping, they give expression, in their song, to an ecstasy of joyous emotion; the strain is taken up and repeated by the different performers, and comes to the listener from various directions and distances, mingled with the notes of the other woodland songsters, and harmonizing with the various sights and perfumes, all of which unite to produce that happy combination—a country May morning.

The nest is usually placed on the ground, in some spot that is well adapted for concealment; but sometimes a low bush or clump of matted vines is selected instead, or, rarely, it is placed in a tree, at a considerable height. I found their nest containing the full complement of



eggs May 24th, 1873, and another May 25th, 1878, that contained five young birds.

*Dimensions.*—Average measurements of five specimens: length, 11·42; stretch, 12·79; wing, 4·06; tail, 5·03; culmen, ·96; gape, 1·31; tarsus, 1·31.

#### Family, **SAXICOLIDÆ.**

**8. *Sialia sialis*, (Linné).** COMMON BLUEBIRD. A resident species; abundant in summer. The migrants arrive early in February, when they are in full song, and depart by the first of December. I have found Bluebirds here throughout the coldest winters, as that of 1874–75, and they are generally quite numerous in milder ones. They then feed on berries, and what insects they can find. They are nearly silent in severe weather, only uttering a low, soft note, inaudible at a little distance; and as they leave their perches, when frightened, a queer little chirrup of alarm; but when the weather is warm they become quite frolicsome, and chase one another, uttering a sharp, rapid twittering, that reminds one of the Kingfisher's rattle.

They breed abundantly, and several times during the season, building their nests in holes in trees, and in the houses prepared for them; they always occupy the two pound tomato cans that I have placed for their use about the premises, but from which, however, they are sometimes ejected by those quarrelsome little free booters—the House Wrens. The eggs of their first brood are deposited very early. A nest found April 16, 1872, contained eggs, and again, one was found April 28th, 1873, which contained four eggs. They were building April 18th, 1877, and the young left the nest May 29th. Young were found, about a week old, April 22nd, 1878, and they were incubating the second brood May 22nd. A note in my journal reads as follows: “A pair has constructed its nest in the limb of an old cherry tree, in a hole excavated by a Downy Woodpecker (*Picus pubescens*), last winter; its orifice is so small that it is with great difficulty that the bird enters. I saw the male bird feeding the mother at the entrance to their house.”

*Dimensions.*—Average measurements of twelve specimens: length, 7·01; stretch, 12·53; wing, 3·93; tail, 2·58; culmen, ·47; gape, 75; tarsus, 75.

#### Family, **SYLVIIDÆ.**

**9. *Regulus calendula*, (Linné).** RUBY-CROWNED KINGLET. Abundant during the migrations. Arrives about the middle of April (April 23, 1873; 7, 1874; 15, 1875; 17, 1876; 13, 1877; 15, 1878), departing about the middle of May (May 9, 1874; 18, 1875; 12, 1876; 8,



1877). On its return in autumn, it is with us from September 22nd (1874) to November 2nd (1874).

In the spring, the Ruby-crowned Kinglet is one of our earliest singing migrants. It is found in great numbers in the evergreen groves, and in bushy places besides the lakes and streams. Its song is one of the sweetest, and much louder than would be supposed, coming from such a little bird.

*Dimensions.*—Average measurements of eleven specimens: length, 4.41; stretch, 7.01; wing, 2.24; tail, 1.73; culmen, .29; tarsus, .67.

**10. *Regulus satrapa*, Licht.** GOLDEN-CRESTED KINGLET. An abundant winter resident. Is present here from the first of October (October 3, 1876; September 28, 1878) till May (May 4, 1875; 7, 1877).

The Golden-crested Kinglet has a feeble, but quite pretty song, in the spring, and in winter it makes a jingling noise, as it rustles about among the evergreens, in company with the Chickadees (*Parus atricapillus*), Nuthatches (*S. S. canadensis* and *carolinensis*), and Brown Creepers (*Certhia familiaris*); it also has a note resembling the common one of the Brown Creeper.

In the fall this delicate species and the preceding are associated together. They then are seen in great numbers, frequenting the edges of ponds and streams, running about over the mud and weeds, in search of food. They throng the river flats, at low tide, searching amongst the sea-weeds for minute molluscous animals, upon which they feed with great avidity. I can recall no prettier sight, at the present moment, than that presented by these great flocks of ruby, and golden-crested little birds, as they hop about upon the seaweed, by the riverside, in the month of October. A Kinglet that I wounded in the woods and brought home, was very tame; it was perfectly gentle from the first, showed no signs of fear, and ate bread, soaked in milk, almost immediately. On being allowed the range of the room, it at once commenced the destruction of the insects that infested our house plants.

*Dimensions.*—Average measurements of fourteen specimens: length, 4.07; stretch, 6.75; wing, 2.14; tail, 1.75.

#### Family, **PARIDÆ.**

**11. *Parus atricapillus*, Linné.** BLACK-CAPPED CHICKADEE. A common, resident species; breeds. They are gregarious, affecting all kinds of woods, but, in winter, are generally found in the evergreens. Large flocks are seen rustling among the reeds of the salt marshes, in spring. I have sometimes seen straggling flocks of Chickadees flying across an open space in the forest, uttering their rare cry of *phêbé* high in the air as they passed overhead. This curiously whistled note sometimes breaks the winter stillness of the woods; and its authorship has been a puzzle to many persons.

They nest in holes in trees. Their eggs, six or eight in number, are deposited early in May. They generally select solitary places for nesting, and are particularly attached to the stunted oak-trees that grow on the mountain tops, and ledges, near the river. On May 11th, 1876, I found a pair of Chickadees that were building their nest in a hole, in a tree that stood in a swamp. The birds were collecting materials for its construction. They gathered a sort of cottony fuzz that grew upon the stems of some tall ferns; alighting at the bases of these plants, they ascended, gleaning, to the very tops, which often bent down under their weight until they touched the water, when they flew to another plant. In this way they gleaned among the ferns until they had accumulated bundles of this substance in their bills, as large as hickory nuts, before depositing it in the tree. Both male and female were working at once. Their timidity often leads them to build their nests in the middle of a stream or morass. Of man, however, they have little fear. Being very fond of flesh, a strip of meat fastened to the porch, is quite sufficient an attraction to bring numbers of them about the house. I have been amused to see them taking liberties with the salted mackerels that the farmers hang out of doors to make them sweet. They are hardy, vivacious little birds, often coming about the dwellings, where their sprightly manners and cheery notes make them familiar to all. They have quite a variety of notes, and among them a very singular love note that I first heard April 30th, 1878. I saw two of them feeding in a pine-tree, by the river, that attracted my attention by a singular shivering note that was quite new to me. They were caressing one another, and, at the moment of utterance, were passing food from one bill to another. On search, I discovered their nest, which was placed in a decayed branch of an oak-tree, on the edge of a cliff. I sometimes see Chickadees in New York city. I recollect one morning, walking up Broadway, I heard the characteristic *tshe-de-jay, tshe-de-jay*, close at hand. I looked about me, but could see nothing of the bird, and began to wonder whether my own thoughts had not translated me from the bustling street into the country woods; but, as I paused, I heard it again, this time its unmistakable *'tshe, dáigh dáigh dáigh*; looking overhead, I saw my friend, Parus, perched upon a telegraph wire, critically examining the numerous strands, that formed a network over the street; occasionally desisting from this important employment, he would take a cool survey of the scene below; the prospect in the street evidently pleased him, and the color and bustle had an exhilarating effect on his spirits, so that he would burst forth into a voluble expression of his approval of the goings-on in the great thoroughfare, and it was this that at first attracted my attention.

*Dimensions.*—Average measurements of thirteen specimens: length, 5.27; stretch, 8.02; wing, 2.53; tail, 2.43; culmen, .37; tarsus, .60.

MONDAY, DECEMBER 2, 1878.

MEETING this evening at 7.30 P. M. The PRESIDENT in the chair. Records of preceding meeting read. Donations and correspondence announced.

Mr. CHARLES DERBY gave an account of the flora of the Sandwich Islands, alluding more especially to the palms. Of these he specified the *Cocos nucifera*, *Areca catechu*, *Caryota urens*, *Caryota sobolifera*, *Arenga saccharifera*, *Arenga obtusifolia*, *Pritchardii martii*, *Pritchardii gaudichaudii*, *Livistonia australis*, *Livistonia subglobosa*, *Sago vitiensis*, etc., mentioning some of the uses in the economy of life that the inhabitants of these islands derive from this source.

Mr. Derby said that the royal palm was introduced some forty years since into the Islands by Rev. D. Judd, the missionary. He brought the seed from Havana. This palm grows to the height of some one hundred and seventy-five feet and is a strikingly beautiful tree.

There are many fine specimens on the Island of the rattan (*Calamus rotang*) that grows rapidly, a single plant often running some seven hundred feet in length.

This subject was discussed by Dr. GEORGE A. PERKINS, who spoke of the palms growing at Cape Palmas on the western coast of Africa, and by Mr. C. COOKE of those on the eastern coast of Africa, Zanzibar, both of these gentlemen having resided several years in these respective localities, and having devoted much attention to the study of natural history.

MONDAY, DECEMBER 16, 1878.

MEETING this evening at 7.30 o'clock. Dr. AMOS H. JOHNSON in the chair. Records of preceding meeting read.

Prof. ALPHEUS HYATT occupied the evening with remarks on the subject of "*Heredity*," which is now attracting the attention of the scientific public. He presented a circular which had been prepared under the direction of the Massachusetts State Board of Health, inviting the cooperation of medical, historical, genealogical, archæological, ethnological, and natural history societies and persons in the investigation of this subject; and requesting a reply to the series of questions therein specified and to return the same to the secretary of the Board.

Mr. Hyatt was listened to with marked attention. His remarks were illustrated by diagrams and the use of the blackboard. Mr. Hyatt has been appointed by the Board to assist in examining the returns and to deduce therefrom such results that will advance the cause of scientific enquiry.





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*A Catalogue of the Fishes of Essex County, Massachusetts, including the fauna of Massachusetts Bay and the contiguous deep waters.*

BY G. BROWN GOODE AND TARLETON H. BEAN.

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### PREFATORY NOTE.

THE following catalogue has been prepared at the request of the officers of the Essex Institute as an aid to the arrangement and study of the Institute collection<sup>1</sup> of local species. It is believed to be complete to the date of publication, and, through the courtesy of Prof. Baird, includes the latest additions made to the fauna by the U. S. Fish Commission in its explorations from the summer stations at Gloucester (1878), Salem and Halifax (1877), Portland (1873), and Eastport (1872).

The field is by no means an untrodden one, having been well traversed during the half-century past by Wheatland, Storer, Agassiz, and Putnam. The improved methods of deep sea research and the zeal of the Gloucester fishermen have, however, been instrumental in adding many new species to the list. Too much cannot be said in commendation of the captains and crews of the off-shore fishing fleet, who have taken an active part in the scientific exploration of the fishing banks, and who have brought in during the past eight months several thousand natural history specimens in alcohol, besides making impor-

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<sup>1</sup>The scientific collections of the Essex Institute are deposited in the museum of the Peabody Academy of Science.

tant physical observations, and recording many valuable observations on the methods employed in the fisheries.

The latest list of the fishes of Massachusetts Bay is the one in Storer's "History of the Fishes of Massachusetts," published in 1867. In that work 134 species were enumerated, with a nominal list of 21 others in an appendix: of the 155 species mentioned, only 111 are marine or brackish-water species known to occur north of Cape Cod; 99 of these are recognized as valid species in this catalogue, and it is but justice to Dr. Storer's accurate workmanship to say that only two or three of those rejected are among the 134 which were described and illustrated by him in the body of his book, viz.: *Muraenoides ingens*, *Muraenoides macrocephalus* and *Petromyzon nigricans*. Several of his species have, however, been identified with well known European forms; and the laws of priority have made necessary changes in the nomenclature of several others.

We enumerate below 183 species, of which 163 inhabit salt or brackish water, 20 fresh water. Of the marine species, 104 have actually been recorded from Essex County, Massachusetts, or from localities within ten miles of its shores, the aggregate for Essex County, including the fresh water species, being 124: the number of marine species from within the limits of Massachusetts Bay, that is, inside of a line from Cape Cod to Cape Ann, is 133; while 29 are from the deeper off-shore waters in the vicinity of Georges, Le Have, Browns and Sable Island Banks. Out of the number recorded from Massachusetts Bay, 83 may be regarded as resident, or regularly to be expected; 46 others are known only as stragglers, and for knowledge of most of these science is indebted to the vigilant outlook kept by Capt. N. E. Atwood from his station on the tip end of Cape Cod. At the end of the paper are given tabular lists showing the faunal relations of the species which are enumerated in the catalogue.

*Smithsonian Institution, March 1, 1879.*

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## CATALOGUE.

Class **PISCES.**

Sub-class **TELEOSTEI.**

Order **PEDICULATI.**

Family **LOPHIIDÆ.**

1. *Lophius piscatorius* Linn. GOOSE-FISH. *Lophius americanus* Storer, Hist. Fish. Mass., 1867, p. 101, pl. xviii, fig. 2. A common resident of the deep waters, often coming to the shores. The museum

of the Essex Institute has a specimen, about four inches in length, taken on the banks of Newfoundland, in 1856, by L. J. Johnson. This is probably the most northern recorded occurrence of the species in the western Atlantic, except an unconfirmed statement by Pennant of its appearance in Hudson's Bay.

## Order PLECTOGNATHI.

### Sub-order GYMNODONTES.

#### Family ORTHAGORISCIDÆ.

**2. *Mola rotunda* Cuv.** SUN-FISH. *Orthagoriscus mola* Storer, Hist. Fish. Mass., 1867, p. 226, pl. xxxiv, fig. 2. Frequently seen on warm summer days, floating on its side at the surface. An individual, four feet in length, was taken off Gloucester, July 31, 1860. The Essex Institute has a specimen, stuffed, taken in Salem harbor in the summer of 1863.

#### Family TETRODONTIDÆ.

**3. *Cirrisomus turgidus* (Mitch.) Jordan & Gilbert.** SWELL-FISH. *Tetrodon turgidus* Storer, Hist. Fish. Mass., 1867, p. 223, pl. xxxlii, fig. 5. The museum of the Essex Institute has a specimen from Salem harbor, probably that recorded by Wheatland (Jour. Essex Co. Nat. Hist. Soc., 1852, p. 124) as having been taken in 1848. The species has also been found at Provincetown by Capt. N. E. Atwood.

### Sub-order SCLERODERMA.

#### Family BALISTIDÆ.

**4. *Balistes capriscus* Linn.** DUSKY FILE-FISH. *Balistes fuliginosus* DeKay, Zool. N. Y. Fish., 1842, p. 339, pl. lvii, fig. 188. This species has several times been taken at Newport, R. I., and Wood's Hole, Mass. In the Colonial Museum at Halifax is a specimen said to have been taken on the coast of Nova Scotia. The species should be looked for in Massachusetts Bay.

**5. *Alutera Schœpfi* (Walb.) Goode & Bean.** ORANGE FILE-FISH. *Monacanthus aurantiacus* Storer, Hist. Fish. Mass., 1867, p. 9, pl. xxxiv, fig. 3. *Ceratacanthus aurantiacus* Gill. *Alutera cuspidata* DeKay. *Aluteres cuspidata* Storer, Hist. Fish. Mass., 1867, p. 233, pl. xxxv, fig. 2. Seldom seen north of Cape Cod. A single individual was taken at Forest River Lead Works, Salem, Aug. 9, 1845, and is now in the museum of the Essex Institute. *A. cuspidata* is the young of this species.



**6. *Monacanthus setifer* Bennett.** BENNETT'S FILE-FISH. *Monacanthus massachusettensis* Storer, Hist. Fish. Mass., 1867, p. 231, pl. xxiv, fig. 4. *Monacanthus signifer* Storer, Hist. Fish. Mass., 1867, p. 232, pl. xxxv, fig. 1. Occasionally seen in summer in protected bays. Storer records specimens from Hingham, Lynn, Nahant, and Boston.

## Order LOPHOBRANCHII.

### Sub-order SYNGNATHI.

#### Family HIPPOCAMPIDÆ.

**7. *Hippocampus antiquorum* Leach.** SEA HORSE. ? *Hippocampus hudsonius* Storer, Hist. Fish. Mass., 1867, p. 222, pl. xxxiii, fig. 4. *Hippocampus antiquorum* Goode, Bull. U. S. National Museum, 1, p. 45, 1878. A single individual was obtained on George's Banks in 1873, by a Portland mackerel schooner. This, or some nearly allied species, has been seen in Massachusetts Bay.

#### Family SYNGNATHIDÆ.

**8. *Siphonostoma Peckianum* (Storer) Gill.** *Syngnathus Peckianus* Storer, Hist. Fish. Mass., 1867, p. 218 (in part). *Siphonostoma Peckiana* Gill, MSS. A specimen was taken in South Mill Pond, Salem, in 1855 (Essex Institute collection).

**9. *Siphonostoma fuscum* (Storer) Jordan & Gilbert.** *Syngnathus Peckianus* Storer, Hist. Fish. Mass., 1867, p. 218 (in part), pl. xxxiii, fig. 3. Specimens were seized by the U. S. Fish Commission, near Beverly bridge, August, 1877.

## Order HEMIBRANCHII.

### Family CENTRISCIDÆ.

**10. *Centriscus scolopax* Linn.** SNIPE FISH. *Centriscus scolopax* Storer, Hist. Fish. Mass., 1867, p. 279. A single individual of this European species was taken at Provincetown, in 1857, by Capt. N. E. Atwood.

### Family FISTULARIIDÆ.

**11. *Fistularia serrata* Cuv.** TOBACCO-PIPE FISH. *Fistularia serrata* Storer, Hist. Fish. Mass., 1867, p. 140, pl. xxv, fig. 1. A specimen of this species, taken at Rockport, Mass., Sept., 1865, is in the collection of the Essex Institute.

## Family GASTEROSTEIDÆ.

**12. *Gasterosteus aculeatus* Linn.** TWO-SPINED STICKLE-BACK. *Gasterosteus biaculeatus* Storer, Hist. Fish. Mass., 1867, p. 40, pl. viii, figs. 2, 3; Putnam, Proc. Essex Institute, i, 1855, p. 148. A resident species associated with those which follow.

**13. *Gasterosteus aculeatus*, sub-species, *trachurus*.** *Gasterosteus Wheatlandi* Putnam, Proc. Essex Inst., v, 1867, p. 4; and in Storer, Hist. Fish. Mass., 1867, p. 278. Specimens of this form taken at Nahant, April 15, 1859, by R. H. Wheatland, M. D., are distinguished by (1) absence of scales on the posterior part of the body, there being six or eight on the anterior part, in front of the second dorsal spine; (2) the uncarinated tail; (3) its small size; and (4) its "short and deep" appearance. None of these characters are of specific value in this genus, the range of individual variation in form and squamation being very wide.

**14. *Gasterosteus pungitius* Linn.** MANY-SPINED STICKLEBACK. *Gasterosteus DeKayi* Putnam, Proc. Essex Inst., i, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 43, pl. viii, fig. 5. *Pygosteus occidentalis* Brevoort, in Gill's Catalogue of the Fishes of the Eastern Coast of North America, 1861, p. 16. A resident species, associated with the preceding and following species, but less abundant. The Essex Institute Museum has specimens two and a half inches long from Salem Mill Pond collected by F. W. Putnam.

**15. *Apeltes quadracus* (Mitchill) Brevoort.** FOUR-SPINED STICKLEBACK. *Gasterosteus quadracus* Putnam, Proc. Essex Inst., 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 41, pl. viii, fig. 4. A resident species frequenting grassy bays and brackish water near the mouths of streams. Many specimens from Salem and vicinity in the museum of the Essex Institute.

## Order TELEOCEPHALI.

## Sub-order HETEROSOMATA.

## Family SOLEIDÆ.

**16. *Solea vulgaris* Linn.** ENGLISH SOLE. *Solea vulgaris* Günther, Catalogue of the Fishes in the British Museum, iv, 1862, p. 463. Two individuals of this species were set free in Massachusetts Bay in 1877, by the U. S. Commissioner of Fisheries.

**17. *Achirus lineatus* Cuv.** AMERICAN SOLE. *Achirus mollis* Storer, Hist. Fish. Mass., 1867, p. 206, pl. xxxii, fig. 1. Storer records the capture of two specimens of this species in 1847, in Charles River, near Boston, and of a single specimen in 1850, at Nahant, which

appears to be its northern limit. Captain Atwood found it abundant at Provincetown, in 1856.

#### Family PLEURONECTIDÆ.

**18. *Pleuronectes glaber* (Storer) Gill.** SMOOTH FLOUNDER, FOOL-FISH, CHRISTMAS FISH. *Platessa glabra* Storer, Hist. Fish. Mass., 1867, p. 199, pl. xxxi, fig. 1. *Euchalarodus Putnami* Gill, Proc. Acad. Nat. Sci., Phila., 1864; Putnam, in Storer's Hist. Fish. Mass., 1867, p. 279. Specimens from Salem Harbor, Nov. 15, 1872, are in the Museum of the Peabody Acad. of Science, as well as several others collected by Mr. Walker, between 1868 and 1874. The Fish Commission obtained young specimens of about two and a half inches, at Beverly bridge, in August, 1877. Others in the collection of the Essex Institute were taken in Salem Harbor, Nov. 15, 1872, measuring from three to four inches. The species appears in Salem Harbor in abundance in late December and early January, coming up into shallow water to spawn. Dr. Bean has demonstrated the fact, that *Euchalarodus Putnami* Gill, is the male of this species. In every particular except in dentition this species exactly corresponds with *Pleuronectes passer* and *P. flesus* of Europe.

**19. *Pseudopleuronectes americanus* (Walb.) Gill.** FLAT-FISH. *Platessa plana* Storer, Hist. Fish. Mass., 1867, p. 195, pl. xxx, fig. 2. A very common resident species, occurring in winter and summer on muddy bottoms in shoal water.

**20. *Limanda ferruginea* (Storer) Goode & Bean.** RUSTY FLOUNDER. *Platessa ferruginea* Storer, Hist. Fish. Mass., 1867, p. 198, pl. xxx, fig. 4. *Platessa rostrata* H. R. Storer, Boston Journ. Nat. Hist. v, 1, 1857, p. 268, pl. viii, fig. 2. A common resident species inhabiting the deep waters of the bay in summer, and approaching the shores in winter. H. R. Storer's species from Labrador is not distinct from this.

**21. *Glyptocephalus cynoglossus* (Linn.) Gill.** CRAIG FLOUNDER. *Glyptocephalus cynoglossus* Gill, Proc. Acad. Nat. Sci., Phil., 1873, p. 361. *Glyptocephalus acadianus* Gill, l. c. A common resident species inhabiting the deepest part of the bay, but never discovered until 1877, when the U. S. Fish Commission found them in great abundance off Salem.

**22. *Lophopsetta maculata* (Mitch.) Gill.** SPOTTED SAND FLOUNDER. *Pleuronectes maculatus* Storer, Hist. Fish. Mass., 1867, p. 204, pl. xxxi, fig. 4. The Essex Institute museum has a specimen from Salem Harbor, by S. L. Walker, in July, 1870, and several specimens were obtained by the U. S. Fish Commission in 1878, in Gloucester Harbor, and at Milk Island. Storer knew it only from Province-



town, where it was observed by Capt. Atwood and himself. The species ranges north to Bucksport, Me.

**23. Hippoglossoides platessoides (Fabricius) Gill.** SAND DAB, ARCTIC FLOUNDER. *Platessa dentatus* Storer, Hist. Fish. Mass., 1867, p. 197, pl. xxx, fig. 3. *Hippoglossoides limandoides* Goode & Bean, Am. Journ. Sci. and Arts, xvii, 1876, p. 39. A common species in the deep waters of the bay, approaching the shores in winter.

**24. Pseudorhombus dentatus (Linnaeus) Günther.** COMMON FLOUNDER. *Platessa oblonga* Storer, Hist. Fish. Mass., 1867, p. 201, pl. xxxi, fig. 2. Storer states that this species occurs as far up the Cape as Wellfleet.

**25. Pseudorhombus oblongus (Mitchill) Günther.** FOUR-SPOTTED FLOUNDER. *Platessa quadrocellata* Storer, Hist. Fish. Mass., 1867, p. 203, pl. xxxi, fig. 3. A single individual was taken at the mouth of Salem Harbor, by the U. S. Fish Commission.

**26. Hippoglossus vulgaris Fleming.** HALIBUT. *Hippoglossus vulgaris* Storer, Hist. Fish. Mass., 1867, p. 192, pl. xxx, fig. 1. Once very abundant in Massachusetts Bay, but now found chiefly at a depth of 100-250 fathoms in the slopes of the outer banks where they are sought by about thirty Gloucester fishing schooners. Individuals are occasionally taken near the shore. In 1875, one weighing about 200 pounds was caught by a dory fisherman off Half-way Rock, Salem Harbor, and one still larger in Gloucester Harbor in August, 1878.

**27. Platysomatichthys hippoglossoides (Walb.) Goode & Bean.** TURBOT. *Reinhardtius hippoglossoides* Gill, Cat. Fish. E. Coast, N. America, 1861, p. 50; name of genus only. *Platysomatichthys pin-guis* Bleeker, Verslagen en Mededelingen der Koninklijke Akademie van Wetenschappen, Amsterdam, xiii, 1862, p. 426. *Hippoglossus grænlandicus* Günther, Cat. Fish. Brit. Mus., iv, 1862, p. 404. An arctic species, frequently brought in by the halibut schooners. Its range extends as far south as the gully between Le Have & Brown's Banks and George's Banks.

#### Sub-order JUGULARES.

#### Family MACRURIDÆ.

**28. Macrurus Fabricii Sundeval.** "GRENADIER," "RAT-TAIL." *Macrurus rupestris* Günther, Cat. Fish. Brit. Mus., iv, 1862, p. 390. An arctic deep-sea species which ranges as far south as George's Banks and is caught in great quantities on the trawl lines of the fishermen.

**29. Macrurus Bairdii Goode & Bean.** BAIRD'S GRENADIER. *Macrurus Bairdii* Goode & Bean, Amer. Jour. Sci. and Arts, xiv, 1877, pp. 471-473. A deep-sea species found in the deep waters of Massa-



chusetts Bay and the Gulf of Maine; discovered by the U. S. Fish Commission in 1877.

#### Family GADIDÆ.

**30. *Gadus morrhua* Linnaeus.** COD-FISH. *Morrhua americanus* Storer, Hist. Fish. Mass., 1867, p. 165, pl. xxvii, fig. 4. Very abundant in the deeper waters off the coast of New England, and coming up the shoals and near the shores to spawn from November, about Cape Ann, to February, on George's Banks.

**31. *Pollachius carbonarius* (Linn.) Bon.** POLLOCK. *Merlangus purpureus* Storer, Hist. Fish. Mass., 1867, p. 180, pl. xxvii, fig. 3. An extremely abundant resident species which, but for foolish prejudice, would constitute an important food resource.

**32. *Microgadus tomcodus* (Walb.) Gill.** TOM-COD, FROST-FISH. *Morrhua pruinosa* Storer, Hist. Fish. Mass., 1867, p. 179, pl. xxvii, fig. 5. A resident species, entering brackish water; common about the wharves and bridges in summer, and taken with nets and hooks in winter in company with the smelt.

**33. *Melanogrammus æglefinus* (Linn.) Gill.** HADDOCK. *Morrhua æglefinus* Storer, Hist. Fish. Mass., 1867, p. 177, pl. xxviii, fig. 1. A common resident species.

**34. *Phycis tenuis* (Mitch.) DeKay.** HAKE. *Phycis americanus* Storer, Hist. Fish. Mass., 1867, p. 187, pl. xxix, fig. 3. A common resident species.

**35. *Phycis chuss* (Walb.) Gill.** *Phycis filamentosus* Storer, Hist. Fish. Mass., 1867, p. 189, pl. xxix, fig. 4. Less abundant than the preceding, from which it is distinguished only by the greater size of its scales.

**36. *Phycis Chesteri* Goode & Bean.** LONG-FINNED HAKE. *Phycis Chesteri* Goode & Bean, Proc. U. S. Nat. Mus., i, 1878, p. 256. A graceful species discovered in 1878, by the U. S. Fish Commission in the deep waters of the bay; only a few specimens have been seen.

**37. *Phycis regius* (Walb.) Jord. & Gilb.** SPOTTED HAKE. *Phycis regalis* Günther, Cat. Fish. Brit. Mus., iv, 1862, p. 354. *Urophycis regius* Gill, Proc. Acad. Nat. Sci., Phila. This species has been observed at Halifax, N. S., and from southern New England. It may therefore claim a place in the fauna of Massachusetts Bay.

**38. *Haloporphyrus viola* Goode & Bean.** BLUE HAKE. *Haloporphyrus viola* Goode & Bean, Proc. U. S. Nat. Mus., i, 1878, p. 257. A species inhabiting the outer slopes of the off-shore banks, at a depth of 200 fathoms or more, and frequently taken by the fishermen on their trawl lines.

**39. *Onos* (Rhinonemus) *cimbrius* (Linn.) Goode & Bean.**

*Gadus cimbrius* Linn., Syst. Nat. *Onos cimbrius* Goode & Bean, Proc. U. S. National Mus., 1878, p. 348. *Motella caudacuta* Storer, Hist. Fish. Mass., 1867, p. 183, pl. xxix, fig. 1. A resident of the deep waters of the bay where it occurs in considerable abundance. The young fish swim at the surface and have been wrongfully identified with the Mackerel Midge, *Ciliata argentata*, which is, at best, a doubtful species, and perhaps the young of a species of *Onos*.

40. *Brosmius brosme* (Müller) White. CUSK. *Brosmius flavescens* Storer (not Lesueur), Hist. Fish. Mass., 1867, p. 190, pl. xxix, fig. 2. *Brosmius brosme* Günther, Cat. Fishes Brit. Mus., iv, 1862, p. 369. *Brosmius flavescens* of Lesueur was apparently founded upon a deformed specimen. A common resident of the inshore fishing grounds, where it occurs in great abundance, lurking among the stones, but is soon caught up by the fishermen after the discovery of a new bank.

#### Family MERLUCIIDÆ.

41. *Merlucius bilinearis* (Mitch.) Gill. WHITING. SILVER HAKE. *Merlucius albidus* Storer, Hist. Fish. Mass., 1867, p. 185, pl. xxviii, fig. 2. A frequent visitor to the shores, probably a resident of the middle depths. Young were frequently trawled in deep water by the U. S. Fish Commission. This species may easily be distinguished from *M. vulgaris* of Europe by the greater number of rays in the first dorsal (X-XI in *M. vulgaris*, XII-XIII in *M. bilinearis*), and by the larger size of the scales (L. lat. about 150 in *M. vulgaris*, 100-110 in *M. bilinearis*).

#### Family LYCODIDÆ.

42. *Lycodes Verrillii* Goode & Bean. VERRILL'S LYCODES. *Lycodes Verrillii* Goode & Bean, Amer. Jour. Sci. and Arts, xvi, 1877, p. 474. A common resident of the deep water of the bay, first discovered in 1877, by the U. S. Fish Commission, in the Gulf of Maine, attains the length of seven inches or more.

43. *Lycodes VahlII Reinhardt*. VAHL'S LYCODES. *Lycodes VahlII* Günther, Cat. Fish. Brit. Mus., iv, 1862, p. 319. This species hitherto known only from Greenland, was taken by Capt. Z. Hawkins and the crew of the schooner "Gwendolen," of Gloucester, at a depth of 300 to 400 fathoms, in Lat. 42° 43' N, and between Long. 62° 20', and 63° 20' W.

44. *Lycodes paxillus* Goode & Bean. Proc. U. S. Nat. Mus., ii, 1879. A single specimen was obtained by Captain Collins in the gully between Le Have and Sable Island Banks.

45. *Zoarces anguillaris* (Peck.) Storer. MUTTON-FISH. *Zoarces*

*anguillaris* Storer, Hist. Fish. Mass., 1867, p. 97, pl. xvii, fig. 4. A common resident of deep water, frequently approaching the shore. In the young a large black blotch, almost equal in diameter to the eye, is found on the anterior part of the dorsal fin. This disappears with age, sometimes before, sometimes after the fish has attained the length of nine inches. No traces of this can be seen on the young of the European *Z. viviparus*, so far as observed by us.

#### Sub-order ACANTHOPTERI.

#### Family CRYPTACANTHIDÆ.

**46. *Cryptacanthodes maculatus* Storer.** WRY-MOUTH. *Cryptacanthodes maculatus* Storer, Report, 1839, p. 28, Hist. Fish. Mass., 1867, p. 34, pl. viii, fig. 6. *Cryptacanthodes inornatus* Gill. Proc. Acad. Nat. Sci., Phila., 1863, p. 332. (Albino variety.) The following specimens of this unusual species are known to us: (1) seven mentioned in Storer's work, one from Nahant, one from Dorchester, one from Provincetown, one from a beach in Nova Scotia, and three from Massachusetts Bay; (2) one collected at Provincetown in 1867, by Captain Atwood, and preserved by the Boston Society of Natural History; (3) seven collected by the U. S. Fish Commission on the coast of Massachusetts. Several specimens of this species have been taken on the shores of Essex County, and of the four known individuals of the albino form, described by Gill as *C. inornatus*, one was obtained at Marblehead and one at Swampscott.

#### Family STICHÆIDÆ.

**47. *Eumesogrammus subbifurcatus* (Storer) Gill.** *Pholis subbifurcatus* Storer, Hist. Fish. Mass., 1867, p. 92. Storer records the capture of a specimen at Nahant, in 1838. It has been taken by the U. S. Fish Commission at Grand Manan and Halifax, and by Prof. Verrill off Anticosti.

**48. *Eumesogrammus unimaculatus* (Reinhardt) Goode & Bean.** *Stichæus unimaculatus* Günther, Cat. Fish. Brit. Mus., iii, 1861 p. 283. A single specimen from the vicinity of Anticosti was sent to the National Museum for identification by Mr. Whiteaves.

**49. *Leptoblennius serpentinus* (Storer) Gill.** EEL-BLENNY. *Blennius serpentinus* Storer, Hist. Fish. Mass., 1867, p. 91, pl. xvii, fig. 1. (Represents the dorsal as divided, which was accidental.) A common resident of the deep waters of the bay; a favorite food of the Cod and Halibut.

**50. *Leptoclinus aculeatus* (Reinh.) Gill.** *Stichæus aculeatus* Günther, Cat. Fish. Brit. Mus., iii, 1861, p. 282. The U. S. Fish Com-



mission obtained several specimens of this arctic species, previously known only from Greenland, in Massachusetts Bay, at depths of forty to ninety fathoms.

#### Family XIPHIDIONTIDÆ.

**51. *Murænoides gunnellus* (Linn.) Goode & Bean.** ROCK-EEL. *Gunnellus mucronatus* Storer, Hist. Fish. Mass., 1867, p. 94, pl. xvii, fig. 2. Common among the rocks near the line of the tide. The Essex Institute has several specimens, the largest six inches long, from Naugus Head, July, 1862. *M. ingens* H. R. Storer, and *M. macrocephalus* Girard, are not distinct from this species.

#### Family ANARRHICHADIDÆ.

**52. *Anarrhichas lupus* Linnæus.** WOLF-FISH, CAT-FISH. *Anarrhichas vomerinus* Storer, Hist. Fish. Mass., 1867, p. 99, pl. xviii, fig. 1. Frequent in the deep waters and approaching the shore, particularly in winter.

**53. *Anarrhichas minor* Olafsen.** SPOTTED CAT-FISH, LEOPARD-FISH. *Anarrhichas minor* Streenstrup, Vidensk. Meddel. Naturh. Foren. Kjöbenhavn, 1876. This well marked species occurs both along the shores and in the deep water. The Fish Commission has specimens from off the mouth of Gloucester Harbor and from Eastport, Maine.

**54. *Anarrhichas latifrons* Streenstrup & Hallg.** BLUE CAT-FISH. *Anarrhichas latifrons* Streenstrup, op. cit. *Lycichthys latifrons* Gill, in Baird's Annual Record of Science and Industry for 1876. A resident of the deep waters in 200 to 400 fathoms on the off-shore banks. Many specimens have been received from the halibut schooners.

#### Family BATRACHIDÆ.

**55. *Batrachus tau* Linnæus.** TOAD-FISH. *Batrachus tau* Storer, Hist. Fish. Mass., 1867, p. 105, pl. xix, figs. 1 and 2. In the collection of the Boston Society of Natural History is a specimen, No. 494, labelled "Massachusetts Bay." The Fish Commission has collected no specimens north of Cape Cod.

#### Family CYCLOPTERIDÆ.

**56. *Cyclopterus lumpus* Linnæus.** LUMP-FISH. *Lumpus anglorum* Storer, Hist. Fish. Mass., 1867, p. 208, pl. xxxii, fig. 2. Frequently taken in winter; the young are often seen swimming at the surface in summer. A northern fish.



**57. Eumicrotremus spinosus (Fabricius) Gill.** SPINY LUMP-FISH. *Lumpus spinosus* Storer, Syn. Fish. N. A., 1846, p. 230. *Cyclopterus spinosus* Günther, Cat. Fish. Brit. Mus., iii, 1861, p. 157. Discovered by the U. S. Fish Commission in the deep water of Massachusetts Bay. Previously known only from Greenland.

#### Family LIPARIDIDÆ.

**58. Liparis vulgaris Fleming.** STRIPED LUMP-SUCKER. *Liparis vulgaris* Günther, Cat. Fish. Brit. Mus., iii, 1861, p. 169; Putnam, Proc. Amer. Assoc. Adv. Sci., 1874, p. 335. A resident of rocky bottoms among the roots of the kelp (*Laminaria saccharina*). Mr. J. H. Sears was the first to discover this species in the vicinity of Salem, or indeed in New England, collecting several specimens among the kelp near Baker's Island, in six feet of water.

**59. Liparis Montagu** Donovan. DARK LUMP-SUCKER. *Liparis* Sp. allied to *L. arctica* Putnam, in Storer's Hist. Fish. Mass., 1867, p. 280. *Liparis Montagu* Putnam, Proc. Amer. Assoc. Adv. Sci., 1874, p. 335. With the preceding species, but less frequent. Putnam, in his papers quoted above, refers to specimens collected by Mr. Alexander and himself at Salem and Nahant.

**60. Liparis ranula Goode & Bean.** Proc. U. S. National Mus., ii, 1879. A single specimen was trawled by the U. S. Fish Commission off Chebucto Head, N. S., at a depth of fifty-two fathoms.

#### Family TRIGLIDÆ.

**61. Prionotus evolans (Linn.) Gill.** STRIPED SEA-ROBIN. *Prionotus lineatus* Storer, Hist. Fish. Mass., 1867, p. 16, pl. v, fig. 4. This species is included with a query in a notice of several fishes of rare occurrence, by Dr. Henry Wheatland, in the Journal of the Essex Co. Natural History Society, 1852, p. 124. Its occurrence north of Cape Cod is still unconfirmed.

**62. Prionotus carolinus (Linn.) Cuv. & Val.** WEB-FINGERED SEA-ROBIN. *Prionotus palmipes* Storer, Hist. Fish. Mass., 1867, p. 18, pl. v, fig. 1. Storer records the capture of this species at Green Island and Phillips' Point, Lynn. Specimens from Salem are in the museum of the Essex Institute. We have examined the supposed type of *P. pilatus* Storer, in the museum of the Boston Society of Natural History. It appears to be identical with *P. punctatus*, but the origin of the specimen is somewhat doubtful.

#### Family AGONIDÆ.

**63. Aspidophoroides monopterygius Bloch., Storer.** GREEN-

LANDER. *Aspidophoroides monopterygius* Putnam, Proc. Essex Inst., i, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 32, pl. viii, fig. 1. An arctic species, occurring in great abundance in the deeper parts of the bay, and even as far south as Watch Hill, R. I. Storer had specimens from the stomachs of haddock, taken in Massachusetts Bay.

#### Family COTTIDÆ.

**64. *Cottus octodecimspinosus* Mitchill.** SCULPIN, TOAD-FISH. *Acanthocottus virginianus* Putnam, Proc. Essex Inst., i, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 28, pl. iv, fig. 2. A common resident species.

**65. *Cottus scorpius* Linn.** NORWAY SCULPIN. *Cottus scorpius* Günther, Cat. Fish. Brit. Mus., ii, p. 158. In an unpublished memoir Dr. Bean has demonstrated the occurrence of this species in Maine.

**66. *Cottus scorpius* L. subsp. *grœnlandicus*.** "DADDY SCULPIN," "GRUBBY," GREENLAND SCULPIN. *Acanthocottus variabilis* Putnam, Proc. Essex Inst., i, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 26, pl. iv, fig. 1. A very common resident of the bays, particularly in winter.

**67. *Cottus æneus* (Mitchill) Cuv. & Val.** PIGMY SCULPIN, "GRUBBY." *Cottus æneus* Mitchill, Trans. Lit. and Phil. Soc., N. Y., 1815, p. 381; DeKay, Zool. N. Y., Fishes, 1842, p. 52. (Not figure.) A common resident of shallow water. The Essex Institute has a specimen collected at Gloucester, May, 1859, by G. H. Price, labelled "*C. Grœnlandicus* young," also from Salem, 1859, collected by Caleb Cooke.

**68. *Uranidea gracilis* (Heckel) Gill.** RIVER BULL-HEAD. *Cottus gracilis* Storer, Hist. Fish. Mass., 1867, p. 24, pl. iv, fig. 3. This species occurs in the streams of eastern New England, and doubtless in Essex County, though we have no record of its capture within its limits.

**69. *Centridermichthys uncinatus* (Reinh.) Günther.** HOOK-EARED SCULPIN. *Centridermichthys uncinatus* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 172. A species very abundant in the deepest parts of the bay.

**70. *Triglops Pingelii* Reinh.** MAILED SCULPIN. *Triglops Pingelii* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 173. *Triglops pleurostictus* Cope. Occasionally taken in company with the preceding. An arctic species.

#### Family HEMITRIPTERIDÆ.

**71. *Hemitripteris americanus* (Gmel.) Storer.** SEA-RAVEN. *Hemitripteris acadianus* Storer, Hist. Fish. Mass., 1867, p. 35, pl. vii, fig. 4. Putnam, Proc. Essex Inst., i, 1855, p. 148. Common in deep

water approaching the shores. Putnam records it from deep water in Salem Harbor.

#### Family SCORPÆNIDÆ.

**72. *Sebastes marinus* (Linnæus) Lütken.** RED-FISH, "SNAPPER." *Sebastes norvegicus* Putnam, Proc. Essex, Inst., i, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 38, pl. vii, fig. 1. Common in summer in the deeper parts of the bay, where it appears to breed. Approaches the shore in winter. Putnam records it from Salem Harbor. Certain Scandinavian naturalists recognize two North Atlantic species in this genus, *S. marinus* (or *norvegicus*) and *S. viviparus*. Those which have come to our notice correspond most nearly with the former. The latter appears to be a dwarf form inhabiting some of the fiords of Norway, and is considered by Collett and others to be a geographical race.

#### Family LABRIDÆ.

**73. *Tautoga onitis* (Linnæus) Günther.** TAUTOG. *Tautoga americana* Storer, Hist. Fish. Mass., 1867, p. 110, pl. xx, fig. 2. Abundant in many localities, near rocky ledges and points.

**74. *Tautogolabrus adspersus* (Walb.) Gill.** CUNNER, PERCH. *Ctenolabrus ceruleus* Storer, Hist. Fish. Mass., 1867, p. 108, pl. xx, fig. 1. Common everywhere in shallow water and in harbors. Called "Nipper" at Salem.

#### Family XIPHIIDÆ.

**75. *Xiphias gladius* Linnæus.** SWORD-FISH. *Xiphias gladius* Storer, Hist. Fish. Mass., 1867, p. 71, pl. xiii, fig. 2. Abundant along the coast in summer, occasionally coming near the shores.

#### Family TRICHIURIDÆ.

**76. *Trichiurus lepturus* Linn.** SCABBARD FISH. *Trichiurus lepturus* Storer, Hist. Fish. Mass., 1867, p. 69, pl. xii, fig. 1. Storer records the capture of this species at Wellfleet, in the summer of 1845. A specimen labelled "Salem Harbor," is in the museum of the Essex Institute. We are unable to learn the date of its capture.

#### Family SCOMBRIDÆ.

**77. *Scomber scombrus* Linn.** MACKEREL. *Scomber vernalis* Storer, Hist. Fish. Mass., 1867, p. 54, pl. xi, fig. 2; Putnam, Proc. Essex Inst., 1856, i, p. 201. Visit the coast of New England yearly in enormous schools, appearing in Massachusetts Bay in May, where,



after spawning, they remain until October or November. Stragglers are occasionally taken in the winter.

**78. Scomber DeKayi Storer.** CHUB-MACKEREL, "THIMBLE-EYE." *Scomber DeKayi* Storer, Hist. Fish. Mass., 1867, p. 52, pl. xi, fig. 1. This species was once very abundant, especially from 1814 to 1825, but appears now to have become extinct in our waters. Specimens are much desired by naturalists. It is probably identical with one of the European species, perhaps *S. pneumatophorus*.

**79. Sarda pelamys (Linn.) Cuv.** BONITO. *Pelamys sarda* Storer, Hist. Fish. Mass., 1867, p. 63, pl. xi, fig. 5. A summer visitor about Cape Cod, appearing in great schools in company with the Blue-fish.

**80. Orcynus thynnus (Linn.) Goode.** HORSE MACKEREL. *Thynnus secundidorsalis* Storer, Hist. Fish. Mass., 1867, p. 65, pl. xii, fig. 4. The Horse Mackerel, barracouta, or albacore is of late years a common summer visitor. In 1878 Capt. Henry Webb killed thirty-seven monsters of this species at his weir on Milk Island. A specimen, now preserved in the Essex Institute, was stranded on the flats of North River, Salem, Aug. 23, 1846. Its length was nine feet, six inches. Another specimen, weighing 775 pounds, stranded on the beach at Beverly, July 29, 1877.

**81. Orcynus alliteratus (Raf.) Gill.** LITTLE TUNNY. *Thynnus thunnina* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 364. This species has lately made its appearance on our coast in summer. We are not aware that any have yet been taken in Massachusetts Bay, but they are certain to be found at no distant period.

**82. Orcynus pelamys (Linn.) Poey.** OCEANIC BONITO. *Thynnus pelamys* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 364. *Orcynus pelamys* Goode & Bean, Proc. U. S. National Museum, 1878, p. 24. A single individual of this European species was obtained at Provincetown in 1860, by Mr. J. H. Blake, and many have since been found to visit the Vineyard Sound.

**83. Orcynus alatunga (Linn.) Gill.** LONG-FINNED TUNNY. *Thynnus alalonga* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 366. A specimen was obtained by Capt. William Thompson, of the schooner "Magic," of Gloucester, in the summer of 1878, on Banquereau, on a trawl, at a depth of 300 fathoms.

**84. Orcynus argentivittatus (Cuv. & Val.) Goode.** FROSTED BONITO. *Thynnus argentivittatus* Günther, Cat. Fish. Brit. Mus., ii, p. 366. Three or four specimens of a large *Orcynus*, received from the New England coast, are provisionally referred to this species.

**85. Cybium maculatum Cuv.** SPANISH MACKEREL. *Cybium maculatum* Storer, Hist. Fish. Mass., 1867, p. 68, pl. xiii, fig. 1. Storer records the capture of an individual of this species at Lynn, July 24, 1841, and states that specimens were obtained at Provincetown.



town in August, 1847, and by Captain Atwood, at Monhegan Island in Maine.

Family CARANGIDÆ.

**86. *Carangus hippos* (Linn.) Gill.** CREVALLÉ. *Caranx defensor* DeKay, Zool. of N. Y. Fishes, 1835, p. 120, pl. xxiv, fig. 72. Wheatland, Journ. Essex Co. Nat. Hist. Soc., 1852, p. 124. A specimen about eighteen inches in length was taken at Lynn Beach by Joseph True and its stuffed skin is preserved by the Essex Institute. This is the only instance of its occurrence north of Cape Cod.

**87. *Paratractus pisquetus* (Cuv. and Val.) Gill.** JACK, YELLOW CREVALLÉ. ? *Caranx chrysos* Storer, Hist. Fish. Mass., 1867, p. 75, pl. xiv, fig. 3. This species, cited by Storer, l. c., as *C. chrysos*, is, undoubtedly, *P. pisquetus*, judging from the forty-eight plates in the lateral line. He had seen a single individual from one of the bridges between Boston and Charlestown. Capt. Atwood found Storer's *C. chrysos* occasionally at Provincetown. A single individual was taken in a net off Gloucester, Sept. 18, 1878.

**88. *Argyriosus vomer* (Linn.) Cuv. & Val.** DOLLAR-FISH. *Argyriosus unimaculatus* Storer, Hist. Fish. Mass., 1867, p. 78, pl. xiv, fig. 2. The Peabody Academy has specimens collected by A. F. Gray at Danvers, Aug. 26, 1876, and in North River, Salem, 1876, by J. W. Kingsley. The Fish Commission obtained several specimens from Magnolia and Gloucester, in 1878, and the species has since been obtained at Halifax, N. S., by Mr. J. Matthew Jones.

**89. *Seriola zonata* (Mitchill) Cuv. and Val.** BANDED RUDDER-FISH. *Seriola zonata* Storer, Hist. Fish. Mass., 1867, p. 79, pl. xv, fig. 5. *Halatractus zonatus* Gill, Proc. Acad. Nat. Sci., Phila., 1862, p. 442. Storer records two specimens taken in the harbor of Wellfleet, one in August, 1844, and one in November, 1849. Capt. Atwood, in 1856, records its occasional occurrence at Provincetown. In the museum of the Essex Institute are two specimens, one from Beverly, taken by Samuel Porter, May 16, 1866; another from North River, Salem, taken by S. F. Goldthwaite.

Family STROMATEIDÆ.

**90. *Palinurichthys perciformis* (Mitch.) Gill.** RUDDER-FISH. *Palinurus perciformis* Storer, Hist. Fish. Mass., 1867, p. 74, pl. xiii, fig. 8. The Rudder-fish may usually be found in summer under floating spars at sea. The Essex Institute has a specimen from Salem, Aug. 6, 1855.

**91. *Poronotus triacanthus* (Peck) Gill.** BUTTER-FISH. *Rhombus triacanthus* Storer, Hist. Fish. Mass., 1857, pl. xv, fig. 4. This

species is not unusual in summer, occurring even as far north as Halifax, N. S. Specimens from Annapolis, N. S., and from Salem Harbor, are in the Essex Institute collection. At Provincetown, according to Capt. Atwood, it is very common, and is known as the "Sheephead." Storer had it from Boston.

#### Family ZENIDÆ.

**92. *Zenopsis ocellatus* (Storer) Gill.** DORY. *Zeus ocellatus* Storer, Proc. Bost. Soc. Nat. Hist., vi, 1858, p. 385; Putnam in Storer, Hist. Fish. Mass., 1867, p. 279. *Zenopsis ocellatus* Gill., Proc. Acad. Nat. Sci., Phila., vi, p. 888. A single individual was obtained at Provincetown, by Capt. N. E. Atwood, which is preserved in the collection of the Boston Society of Natural History—the only specimen of the species. For 92a see p. 31.

#### Family SCIÆNIDÆ.

**93. *Cynoscion regalis* (Bloch.) Gill.** SQUETEAGUE, WEAK-FISH. *Otolithus regalis* Storer, Hist. Fish. Mass., 1857, p. 44, pl. ix, fig. 1. This species rarely passes to the north of Cape Cod, but, in 1878, three individuals were taken in the weir at Milk Island, Cape Ann.

**94. *Pogonias cromis* (Linn.) Cuvier.** DRUM. *Pogonias chromis* Günther, Cat. Fishes E. Coast, N. A., ii, 1860, p. 270. One or two individuals of this southern species have been observed at Provincetown.

**95. *Menticirrhus nebulosus* (Mitch.) Gill.** KING-FISH. *Umbrina nebulosa* Putnam, Proc. Essex Inst., i, 1856, p. 201; Storer, Hist. Fish. Mass., 1867, p. 46, pl. ix, fig. 4. Storer records four specimens, one from a lobster pot at Boston Lighthouse, taken previous to 1833; one from Lynn, 1840; and two from Provincetown, July, 1846 and Nov., 1847, in mackerel nets. The Salem Collection includes two specimens: one, eight inches long, taken off Marblehead Light, Oct. 15, 1872, by J. P. Haskell; another, six and one-half inches long, taken at Spite Bridge, Danvers, Oct. 28, 1874. No others are recorded from north of Cape Cod.

#### Family SPARIDÆ.

**96. *Stenotomus argyrops* (Linn.) Gill.** SCUPPAUG, SCUP. *Pagrus argyrops* Putnam, Proc. Essex Inst., i, 1856, p. 201; Storer, Hist. Fish. Mass., 1867, p. 49, pl. x, fig. 3. This species, formerly, rarely passed the boundary of Cape Cod; in 1878, however, thirty-seven were taken at the Milk Island, Weirs, and they appear to be increasing in abundance.

This species does not appear to be indigenous north of Cape Cod. Storer gives the following account of its introduction: "Mr. James Newcomb, fishmonger, in the Boston market, informs me that, in the year 1831 or 1832, a smack-load of Scapaugs arrived in Boston Harbor. A portion of them were purchased by subscription among the fishermen in the market, and thrown into the harbor. The next season two specimens were caught from our wharves; in the summer of 1835, one individual was taken at Nahant, and was considered a very strange fish, no specimen having been known to have been seen there before; in 1836, still another was captured at Nahant. As no specimen had ever been taken so far north before, and as the few taken would lead to the inference that those which had been transplanted from Buzzard's Bay had not bred in the cold waters of this portion of Massachusetts Bay, we are led to believe that the individuals taken immediately around Boston, were of the number originally brought from the south. In the year 1834 or 1835, Capt. Wm. Downes, of Holmes' Hole, carried a smack-load of this species from Vineyard Sound and threw them overboard in Plymouth Harbor." *Op. cit.*, p. 51. Storer, writing in 1867, says, that "within a few years small numbers have appeared north of Cape Cod and are yearly captured at Wellfleet and Sandwich."

Judging from the rare occurrence of the species thus introduced, it can hardly be considered to have become naturalized; the few which have been taken were doubtless summer stragglers. In the Boston Society's Museum is a specimen taken at Swampscott, June 29, 1860, by J. Phillips. In the Salem Museum is another taken in Salem harbor, July 23, 1860, by C. A. Putnam. Scup become abundant on the south side of Cape Cod, from the fifth to the twelfth of May, which would allow ample time for the appearance of a part of the school off the eastern coast of Massachusetts, as early as the dates recorded.

Mr. Hinckley, Pres. of Phila., Wilm. & Balt. R. R., informs us that in the winter of 1833 he found a dead scuppaug on the Cohasset shore; this was its first occurrence in that locality, and none of the fishermen knew it.

In 1856, Capt. Atwood recorded the Scup as very rare at Provincetown.

#### Family CENTRARCHIDÆ.

**97. *Lepiopus auritus* (Linn.) Raf.** RED-TAILED BREEM.  
*Pomotis appendix* Storer, Hist. Fish. Mass., 1867, p. 14, pl. iii, fig. 4.  
This species occurs in Wenham pond and other bodies of fresh water in Essex County.

**98. *Eupomotis aureus* (Walb.) Gill & Jordan.** "PUMPKIN

SEED." POND-FISH. *Pomotis vulgaris* Storer, Hist. Fish. Mass., 1867, p. 12, pl. iii, fig. 1. This species abounds in the fresh water ponds.

99. *Enneacanthus obesus* (Baird) Gill. SPOTTED SUN-FISH. *Enneacanthus obesus* Jordan, Man. Vertebrates, N. America, 1877, p. 245. We notice in the collection of the Essex Institute several specimens of this little species from Wenham lake, Danvers and Beverly.

100. *Micropterus pallidus* (Raf.) Gill & Jordan. BLACK BASS. *Huro nigricans* DeKay, Zool. of New York Fishes, p. 15, pl. lxix. The Black Bass has been introduced from northern New York into numerous ponds throughout the thickly settled portions of New England. The allied species, *Micropterus achigan*, the Small-mouthed Black Bass, has also been placed in the waters of Massachusetts, and is probably found in Essex County.

#### Family SERRANIDÆ.

101. *Centropristis atrarius* (Linn.) Bon. BLACK SEA-BASS. *Centropristes varius* Putnam, Proc. Essex Inst., 1855, p. 144; Storer, Hist. Fish. Mass., 1867, p. 10, pl. ii, fig. 4. Four individuals are recorded from north of Cape Cod; one from Nahant, July 1, 1846, Storer; one from Salem harbor, May 22, 1855, Putnam; one from Beverly bar, June 20, 1860; and one from Salem, 1866, Wheatland; the latter two in the museum of the Essex Institute.

#### Family PERCIDÆ.

102. *Perca fluviatilis* L. POND PERCH. *Perca flavescens* Storer, Hist. Fish. Mass., 1867, p. 4, pl. ii, fig. 1. Abundant everywhere in ponds and streams.

#### Family ETHEOSTOMATIDÆ.

103. *Boloeosoma Olmstedii* (Storer) Ag. STORER'S DARTER. *Etheostoma Olmstedii* Storer, Hist. Fish. Mass., 1867, p. 30, pl. iv, fig. 1. Probably occurs in the small streams of the country.

104. *Boleichthys fusiformis* (Girard) Jordan. RED-SIDED DARTER. *Boleichthys fusiformis* Jordan, Manual Vertebrates, N. A., 1876, p. 228. This species was described from Charles river. The Essex Institute has specimens from a small brook of Melrose pond, collected May 12, 1860; from Wenham lake and Newhall's crossing.

#### Family LABRACIDÆ.

105. *Roccus lineatus* (Schn.) Gill. STRIPED BASS. *Labrax lineatus* Putnam, Proc. Essex Inst., i, 1855, p. 144. Storer, Hist. Fish.



Mass., 1867, p. 6, pl. i, fig. 4. This species is a common resident, penetrating far up the larger rivers.

**106. *Morone americana* (Gmel.) Gill.** WHITE PERCH. *Labrax rufus* Putnam, Proc. Essex Inst., i, 1855, p. 144; Storer, Hist. Fish. Mass., 1867, p. 9, pl. i, fig. 1. Common in brackish water, at the mouths of rivers, and in ponds to which the sea has access, sometimes becoming land-locked.

The Essex Institute has specimens from Floating Bridge pond, Salem, and from Flax pond, Lynn.

#### Family POMATOMIDÆ.

**107. *Pomatomus saltatrix* (Linn.) Gill.** BLUE-FISH. *Temnodon saltator* Storer, Hist. Fish. Mass., 1867, p. 81, pl. xv, fig. 1. The Blue-fish is an abundant summer resident, appearing in May or June, and departing in October. For a full account of their periods of absence from the coast, and abundance, see Professor Baird's essay on the subject, in his first report as Commissioner of Fisheries.

#### Family PRIACANTHIDÆ.

**108. *Pseudopriacanthus altus* Gill.** BIG EYE. *Priacanthus altus* Gill, Proc. Acad. Nat. Sci., Phila., 1863, p. 332; Putnam in Storer's Hist. Fish. Mass., 1867, p. 278. A specimen of this species was taken at Marblehead beach, Sept. 3, 1859, by Miss Mary Nichols, of Salem, and is preserved in the museum of the Essex Institute.

#### Family AMMODYTIDÆ.

**109. *Ammodytes americanus* DeKay.** SAND-EEL, LANT. *Ammodytes americanus* Storer, Hist. Fish. Mass., 1867, p. 216, pl. xxxiii, fig. 2. A common species, especially abundant about Cape Cod, burrowing in the sand shoals. A favorite food of the cod and other predaceous species.

**110. *Ammodytes dubius* Rhdt.** This species is inserted on the authority of Dr. Günther, who identified with it specimens from Boston, Mass.

#### Family ECHENEIDÆ.

**111. *Echeneis naucrateoides* (Zuiew.) Gill.** WHITE-TAILED REMORA, "SUCKER." *Echeneis albicauda* Wheatland, Proc. Essex Co. Nat. Hist. Soc., 1852, p. 124; Storer, Hist. Fish. Mass., 1867, p. 210, pl. xxxii, fig. 3. Wheatland refers to a specimen taken at Collins' cove, Aug., 1850. Another was taken at the mouth of the Merrimac river, June, 1870, Putnam.

**112. Remoropsis brachyptera** (Lowe) Gill. SWORD-FISH SUCKER. *Echeneis quatuordecemlaminatus* Storer, Hist. Fish. Mass., 1867, p. 212, pl. xxxii, fig. 4. A parasite of the sword-fish (*Xiphias gladius*) and not unfrequently accompanying that species into Massachusetts Bay. We have seen specimens from Newfoundland.

**113. Remora jacobæa** Lowe (Gill). A specimen labelled "*Echeneis remora*," taken in Salem harbor, is in the museum of the Essex Institute. It should be examined carefully before this species is permanently placed on the Massachusetts Bay list, though it is quite possible that an individual may have found its way to Salem, clinging to the bottom of some vessel from a southern port.

#### Family ATHERINIDÆ.

**114. Chirostoma notatum** (Mitch.) Gill. SILVERSIDES, SAND-SMELT. *Atherina notata* Storer, Hist. Fish. Mass., 1867, p. 87, pl. xvi, fig. 1. Abundant in summer, in large schools in the shallow bays, where they breed freely.

#### Family MUGILIDÆ.

**115. Mugil brasiliensis** Agassiz. STRIPED MULLET. *Mugil lineatus* Storer, Hist. Fish. Mass., 1867, p. 39, pl. xvi, fig. 4. Storer records the capture of a single individual at Provincetown in November, 1851.

#### Sub-order SYNENTOGNATHI.

##### Family BELONIDÆ.

**116. Belone longirostris** (Mitch.) Gill. *Belone truncata* Storer, Hist. Fish. Mass., 1867, p. 136, pl. xxiv, fig. 3. Occasionally ascending rivers far above tide water.

#### Family SCOMBRESOCIDÆ.

**117. Scomberox saurus** (Walb.) Flem. "BILL-FISH," SKIP-JACK. *Scomberox storeri* Storer, Hist. Fish. Mass., 1867, p. 137, pl. xxiv, fig. 4. Schools of this remarkable species are occasionally seen in the autumn. The Essex Institute has specimens collected in Massachusetts Bay, Oct., 1855, by C. F. Robbins, and J. Chadwick. Capt. Hurlbert has seen them as far north as Monhegan Island, Maine. Putnam has recorded the occurrence of *Hemirhamphus* sp. in Danvers Mill Pond.

#### Sub-order HAPLOMI.

##### Family CYPRINODONTIDÆ.

**118. Hydrargyra majalis** (Walb.) Val. BANDED MUMMICHOG, "BASS FRY," "YELLOW TAIL." *Hydrargyra flavula* Storer, Hist. Fish.

Mass., 1867, p. 131, pl. xxiii, fig. 5, male; fig. 6, female. Common in brackish water. The Essex Institute has specimens one-fourth to one-third of an inch in length, collected in South Mill Pond, June 19, 1859, by R. H. Wheatland.

**119. *Fundulus pisculentus* (Mitch.) Cuv. & Val.** MINNOW, MUMMICHOG, "COBBLER." *Fundulus pisculentus* Storer, Hist. Fish. Mass., 1867, p. 128, pl. xxiii, fig. 3, male; fig. 4, female. Common everywhere in brackish water.

**120. *Fundulus nigrofasciatus* (Les.) Cuv. & Val.** *Fundulus nigrofasciatus* Storer, Hist. Fish. Mass., 1867, p. 129, pl. xxiii, fig. 1. Storer records this species from fresh ponds, Cambridge. It has not been studied by us.

**121. *Fundulus multifasciatus* (Les.) Cuv. & Val.** BARRED MINNOW. *Fundulus multifasciatus* Storer, Hist. Fish. Mass., 1867, p. 130, pl. xxiii, fig. 2. Storer speaks of having specimens from Concord and Lowell. A specimen from Wenham lake in the museum of the Essex Institute agrees with his description. The species has not been studied by us.

#### Family ESOCIDÆ.

**122. *Esox reticulatus* Les.** PICKEREL, "FEDERATION PIKE." *Esox reticulatus* Storer, Hist. Fish. Mass., 1867, p. 133, pl. xxiv, fig. 2. Common everywhere in ponds and large streams.

**123. *Esox americanus* Gmelin.** BROOK PICKEREL. *Esox ornatus* Storer, Hist. Fish. Mass., 1867, p. 135, pl. xxiv, fig. 2. Not uncommon in the brooks and ponds. The Essex Institute has specimens from Wenham lake.

#### Sub-order ISOSPONDYLI.

#### Family CHAULIODONTIDÆ.

**124. *Chauliodus Sloanei* Schneider.** CHAULIODUS. *Chauliodus Sloanei* Günther, Cat. Fish. Brit. Mus., p. 392. A specimen of this species was taken from the stomach of a cod-fish on George's banks by a Gloucester fisherman and presented to the Essex Institute, June 3, 1874, by Procter Brothers, of Gloucester.

#### Family SCOPELIDÆ.

**125. *Scopelus gemmifer* Goode & Bean.** *Scopelus gemmifer* Goode & Bean, MS.

**126. *Scopelus speculiger* Goode & Bean.** *Scopelus speculiger* Goode & Bean, MS. Specimens of the two undescribed species named above were brought in by several vessels of the Gloucester halibut fleet.

**127. *Scopelus Humboldtii*.** Dr. Storer mentions eight specimens identified by him with this species, one from Nahant and nine from Provincetown.

#### Family STOMIATIDÆ.

**128. *Echiostoma barbatum* Lowe.** A single individual of this species was received recently from one of the Gloucester fleet. It differs somewhat from Dr. Günther's, but agrees with Lowe's description. *E. barbatum* has been recorded only from Madeira.

**129. *Malacosteus niger* Ayres.** *Malacosteus niger* Ayres, Bost. Jour. Nat. Hist., 1849, p. 53; Günther, Cat. Fish. Brit. Mus., v., 1864, p. 428. A single specimen eight and one-half inches long is known. This was the type of Dr. Ayres' description; it was picked up at sea in lat. 42 degrees N., and long. 50 degrees W.

#### Family MICROSTOMIDÆ.

**130. *Argentina syrtensium* Goode & Bean.** WESTERN ARGENTINE. *Argentina syrtensium* Goode & Bean, Proc. U. S. Nat. Mus., i, 1878, p. 261. A single individual was taken from the stomach of a halibut on LeHave bank, in September, 1878.

**131. *Osmerus mordax* (Mitch.) Gill.** SMELT. *Osmerus viridescens* Storer, Hist. Fish. Mass., 1867, p. 149, pl. xxiv, fig. 4. Abundant in the fall and winter, entering brackish water for the purpose of spawning. This species is well separated from *O. eperlanus* by its smaller scales. *Mallotus villosus* has not been recorded south of Halifax, N. S.

#### Family SALMONIDÆ.

**132. *Salmo salar* Linn.** SALMON. *Salmo salar* Storer, Hist. 1867, p. 142, pl. xxv, fig. 2. At one time abundant in the rivers of Massachusetts and now being restored artificially. Enters the rivers in midsummer and spawns in November. *Salmo salar* subsp. *sebago*, the Land-locked Salmon, has been extensively introduced into the waters of the State.

**133. *Salvelinus fontinalis* (Mitchill) Gill & Jordan.** SPECKLED TROUT. *Salmo fontinalis* Storer, Hist. Fish. Mass., 1867, p. 144, pl. xxv, fig. 3. A resident of the brooks, some individuals entering the sea in summer.

#### Family ALEPIDOSAURIDÆ.

**134. *Alepidosaurus ferox* Lowe.** LANCET-MOUTH. *Alepidosaurus ferox* Günther, Cat. Fish. Brit. Mus., v, 1864, p. 421. Many



specimens are taken by the cod and halibut schooners on George's and other fishing banks at the depth of 80 to 400 fathoms.

#### Family ALEPOCEPHALIDÆ.

**135. *Alepocephalus Bairdii* Goode & Bean.** Proc. U. S. National Museum, ii, 1879. BAIRD'S ALEPOCEPHALUS. A single specimen about two feet long was taken by one of the Gloucester fishing vessels on the off-shore banks. Other genera of this family have recently been described from the abyssal faunæ of the mid-Atlantic and Pacific. The genus *Alepocephalus* has heretofore been known only from the Mediterranean.

#### Family CLUPEIDÆ.

**136. *Clupea harengus* Linnæus.** HERRING. *Clupea elongata* Storer, Hist. Fish. Mass., 1867, p. 152, pl. xxvi, fig. 1. The herring schools make their appearance in October and November. They spawn near the shores in November and December and on George's banks later in the winter.

**137. *Alosa sapidissima* (Wilson) Storer.** SHAD. *Alosa præstabilis* Storer, Hist. Fish. Mass., 1867, p. 154, pl. xxvi, fig. 2. Shad enter the rivers in May in large schools for the purpose of spawning. They are often taken at sea in the fall. The Essex Institute has a specimen from Salem harbor.

**138. *Pomolobus vernalis* (Mitch.) Goode & Bean.** ALEWIFE. *Alosa tyrannus* Storer, Hist. Fish. Mass., p. 156, pl. xxvi, fig. 3. *Pomolobus pseudoharengus* Gill (in part). The alewives enter the rivers with the shad in spring. They frequent the coasts in large schools in summer, and some of them perhaps spawn at sea.

**139. *Pomolobus æstivalis* (Mitch.) Goode & Bean.** BLUE BACK, KYACK. *Alosa cyanonoton* Storer, Hist. Fish. Mass., p. 161, pl. xxvii, fig. 1. *Pomolobus pseudoharengus* Gill (in part). This species, which much resembles the preceding, from which it may be distinguished by its smaller eyes, lower fins, and black lining of the abdominal cavity, does not make its appearance until late spring and early summer.

**140. *Pomolobus mediocris* (Mitch.) Gill.** HICKORY SHAD. *Alosa lineata* Storer, Hist. Fish. Mass., 1867, p. 162, pl. xxvii, fig. 2. Capt. Atwood and Dr. Storer speak of this fish as abundant at Provincetown, and it doubtless occurs at the Essex County side of the bay. It is easily distinguished from the common alewife by its projecting under jaw.

**141. *Brevoortia tyrannus* (Latrobe) Goode.** MENHADEN, POGY. *Alosa menhaden* Storer, Hist. Fish. Mass., 1867, p. 158, pl. xxvi, fig. 4. A common summer visitor, appearing in enormous schools in May and

departing in October and early November. Immense quantities are seined for the oil and guano factories on the coast of Maine and at Provincetown. The Essex Institute has specimens of young, three and one-half inches long, taken at Spite bridge, Danvers, Oct. 28, 1874, interesting from the fact that few young of this species have been observed north of Cape Cod.

#### Family ENGRAULIDIDÆ.

**142. *Engraulis vittatus* (Mitchill) Baird & Girard.** ANCHOVY. *Engraulis vittatus* Storer, Hist. Fish. Mass., 1867, p. 163, pl. xxvii, fig. 3. Storer records the capture of a single specimen at Provincetown, in November, 1852.

#### Sub-order EVENTOGNATHI.

#### Family CATOSTOMIDÆ.

**143. *Catostomus teres* (Mitch.) Les.** SUCKER. *Catostomus bostoniensis* Storer, Hist. Fish. Mass., 1867, p. 124, pl. xxii, fig. 3. Very common in all fresh waters of Massachusetts.

**144. *Erimyzon sucetta* (Les.) Jordan.** CHUB-SUCKER. *Catostomus gibbosus* Storer, Hist. Fish. 1867, p. 124, pl. xxii, fig. 4. Common in fresh water; the Essex Institute has specimens from Miles river, Wenham.

#### Family CYPRINIDÆ.

**145. *Carassius auratus* (Linn.) Bleeker.** GOLD-FISH. *Cyprinus auratus* Storer, Hist. Fish. Mass., 1867, p. 115, pl. xxi, fig. 1. This species was introduced many years ago from China. Storer, writing in 1867, remarked "It thrives in quite a number of ponds in the neighborhood of Boston, connected with country seats, bearing well the rigors of our winter, and breeding freely." The Essex Institute has specimens from a pond in Salem.

**146. *Luxilus cornutus* (Mitch.) Jordan.** RED-FIN. *Hypsolepis cornutus* Storer, Hist. Fish. Mass., 1867, p. 118, pl. xxi, fig. 3. Common in streams; the Essex Institute has specimens from Wenham lake, and from the Merrimac river at Andover.

**147. *Notemigonus chrysoleucus* (Mitch.) Jordan.** SHINER. *Leucosomus americanus* Storer, Hist. Fish. Mass., 1867, p. 117, pl. xxi, fig. 2. Very common in ponds throughout New England. The Essex Institute has specimens from Wenham lake.

**148. *Semotilus bullaris* (Raf.) Jordan.** ROACH, "DACE." *Chilonemus pulchellus* Storer, Hist. Fish. Mass., 1867, p. 120, pl. xxii,

fig. 2. Not uncommon in fresh water. The Essex Institute has specimens from Wenham lake.

**149. *Rhinichthys atronasmus* (Mitch.) Ag.** BLACK-NOSED DACE. *Argyreus atronasmus* Storer, Hist. Fish. Mass., 1867, p. 122, pl. xxi, fig. 4. Common in brooklets everywhere in Massachusetts. The Essex Institute has specimens from Groveland.

## Order NEMATOGNATHI.

### Family SILURIDÆ.

**150. *Amiurus catus* (Linn.) Gill.** "BULL-HEAD," HORNED POUT. *Pimelodus atrarius* Storer, Hist. Fish. Mass., 1867, p. 118, pl. xx, fig. 3. Common in quiet ponds everywhere.

## Order APODES.

### Family CONGRIDÆ.

**151. *Conger vulgaris* Cuv.** CONGER EEL. Conger eels and their curious transparent young—"phantom fish"—are occasionally seen. The museum of the Essex Institute has a specimen of the larval form of the so-called *Leptocephalus*, collected at Nahant beach, July 22, 1858, by Caleb Cooke.

### Family ANGUILLIDÆ.

**152. *Anguilla vulgaris* Turton.** EEL. *Anguilla bostoniensis* Storer, Hist. Fish. Mass., 1867, p. 214, pl. xxxiii, fig. 1. Eels are common in both fresh and salt water. They are supposed to descend to the sea in the fall for the purpose of spawning.

### Family NEMICHTHYIDÆ.

**153. *Nemichthys scolopaceus* Richardson.** SNIPE-EEL. *Nemichthys scolopaceus* Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 21. Two specimens of this remarkable eel-like fish have been obtained from the stomachs of fishes on George's banks.

### Family SYNAPHOBANCHIDÆ.

**154. *Synphobranchus pinnatus* (Gronow) Günther.** TWIN-GILLED EEL. *Synphobranchus pinnatus* Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 23. A common resident of the deep waters of the off-shore banks in 200 to 300 fathoms, where individuals are often taken on the fishermen's trawl-lines.

## Family SACCOPHARYNGIDÆ.

**155. *Saccopharynx flagellum* Mitchill.** GULPER. *Saccopharynx flagellum* Günther, Cat. Fish. Brit. Museum, viii, 1870, p. 22. A deep-sea fish. Mitchill's specimen was taken in latitude 52 degrees N.; long. 80 degrees W.

## Family SIMENCHELYIDÆ.

**156. *Simenchelys parasiticus* Gill.** MS. PUG-NOSED EEL. Several specimens of an undescribed eel-like fish were obtained on the halibut trawls, on the off-shore banks. This strange form has much of the physiognomy of a Carapus (*Gymnotus*), and has a short, blunt snout, but is a true Apodal and has an eel-like tail. The branchial apertures are short longitudinal slits on each side of the throat below the pectorals, which are well developed; the dorsal commences about a head's length behind the pectorals; the anal considerably in advance of the second half of the total length. The skin has scales like those of *Anguilla*, linear, scattered, and disposed at right angles to each other. The head is very short; the premaxillaries and maxillaries of each side consolidated into a single piece and separated from that of the opposite side by the ethmoid, and provided with lamelliform posterior margin and an expanded antero-terminal process; mandible very deep; teeth blunt, uniserial; the operculum sabre-shaped. The type appears to belong to the suborder of Enchelycephali. The single species (*Simenchelys parasiticus*) is dark brown colored in life, and individuals have been found burrowing into the flesh of the halibut.

## Sub-class GANOIDEA.

## Super-order Chondrostel.

## Order GLANIOSTOMI.

## Family ACIPENSERIDÆ.

**157. *Acipenser oxyrhynchus* Mitchill.** SHARP-NOSED STURGEON. *Acipenser oxyrhynchus* Storer, Hist. Fish. Mass., 1867, p. 237, pl. xxxv, fig. 4. Ascending rivers and not unusual along the shores. The Essex Institute has a stuffed specimen from the Merrimac, at Lawrence, collected by C. K. Stevens.

**158. *Acipenser brevirostris* Lesueur.** BLUNT-NOSED STURGEON. *Acipenser brevirostrum* DeKay, Zool. of N. Y., 1842, p. 345. This short-nosed form of the coast sturgeon is represented in the museum of the Essex Institute by a stuffed skin obtained at Rockport, by J. N. Martin.



Sub-class **ELASMOBRANCHII.**Super-order **Holocephali.**Order **HOLOCEPHALI.**Family **CHIMÆRIDÆ.**

**159. *Chimæra plumbea* Gill.** BROWN CHIMÆRA. *Chimæra plumbea* Gill, Bull. Phil. Soc., Washington, 1877. Very common in the deep water on the outer edges of banks north of George's Banks, and often brought in by the Gloucester halibut schooners.

Super-order **Plagiostomi.**Order **RAIÆ.**Sub-order **SARCURA.**Family **TORPEDINIDÆ.**

**160. *Torpedo occidentalis* Storer.** CRAMP-FISH. *Torpedo occidentalis* Storer, Hist. Fish. Mass., 1867, pl. 271, pl. xxxix, fig. 5. This species is rarely taken north of Cape Cod. Three or four individuals have been seen in summer on the south side of Cape Ann. One was taken near Lanesville, in 1878.

Family **RAIAIDÆ.**

**161. *Raia granulata* Gill.** MS. A remarkable species with back and ventral surface covered with minute sharp granular ossifications obtained by Capt. Joseph W. Collins on Le Have Bank. A species of the same type as *R. lævis*, and having 30-31 teeth on each side; the back granulated and slate-colored; the ventrals distinguished by reticulate markings, and the claspers slender and scarcely expanded.

**162. *Raia erinacea* Mitchill.** CLEAR-NOSED SKATE. *Raia diaphanes* Storer, Hist. Fish. Mass., 1867, p. 264, pl. 39, fig. 1. Abundant in the waters of Massachusetts bay at a depth in summer of twenty-five or thirty fathoms.

**163. *Raia radiata* Donovan.** Not uncommon in company with the preceding.

**164. *Raia eglanteria* Lacepede.** Occasionally captured in company with the preceding; a more southern species.

**165. *Raia lævis* Mitchill.** BARN-DOOR SKATE. *Raia lævis* Storer, Hist. Fish. Mass., 1867, p. 266, pl. xxxix, fig. 2. Frequently taken in deep water.

**166. *Raia ocellata* Mitchill.** SPOTTED SKATE. Two or three individuals were collected by the U. S. Fish Commission in 1878. This species is very abundant in shallow water at Portland, Me.

Family TRYGONIDÆ.

**167. *Trygon centrura* (Mitch.) Gill.** STINGAREE. *Pastinaca hastata* Storer, Hist. Fish. Mass., 1867, p. 268, pl. xxxiv, fig. 3. This species has not been observed north of Cape Cod, but we are informed by Capt. R. H. Hurlbert, of Gloucester, an accurate observer, that they are sometimes taken on the George's Banks.

Order SQUALI.

Family LAMNIDÆ.

**168. *Lamna cornubica* (Gmel.) Flem.** PORBEAGLE, MACKEREL SHARK. *Lamna cornubica* Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 389. A young individual, agreeing with the description of this species by European authors, was taken off Gloucester, in Oct., 1878.

**169. *Carcharodon Atwoodi* (Storer) Gill.** MAN-EATER SHARK. *Carcharias Atwoodi* Storer, Hist. Fish. Mass., 1867, p. 246, pl. xxxvi, fig. 4. The type of this species was obtained at Provincetown. One or two instances of its capture in Massachusetts Bay are on record.

Family CETORHINIDÆ.

**170. *Cetorhinus maximus* (Linn.) Blainv.** BONE SHARK, GURRY SHARK. *Selachus maximus* Storer, Hist. Fish. Mass., 1867, p. 253, pl. xxxvii, fig. 3. This gigantic shark is sometimes encountered by the Gloucester fishermen. Prof. Verrill has recorded<sup>2</sup> the occurrence in the summer of 1870, at Eastport, Me., of three specimens twenty-five to thirty feet in length, and one previously taken in 1868, which measured thirty-five feet. Mitchill writing in 1814, spoke of its occasional occurrence at Provincetown. Storer mentions a specimen measuring thirty feet and three inches, harpooned in Provincetown Harbor, in 1839.

Family ODONTASPIDIDÆ.

**171. *Eugomphodus littoralis* (Mitchill) Gill.** SAND SHARK. *Carcharias griseus* Storer, Hist. Fish. Mass., 1867, p. 241, pl. xxxvi, fig. 1. Capt. Atwood records this species as very abundant at Provincetown, in 1856, and it doubtless is found in other parts of the bay.

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<sup>2</sup> Bulletin Essex Institute, III, p. 6.

## Family ALOPECIIDÆ.

**172. *Alopias vulpes* (Linn.) Bon.** SWINGLE-TAIL, THRASHER SHARK. *Carcharias vulpes* Storer, Hist. Fish. Mass., 1867, p. 245, pl. xxxvi, fig. 3. Several "Swingle-tails," have been taken within the past ten years, between Boston and Gloucester.

## Family SPHYRNIDÆ.

**173. *Sphyrna zygaena* (Linn.) Mull. & Henle.** HAMMER-HEAD SHARK. *Zygaena malleus* Storer, Hist. Fish. Mass., 1867, p. 262, pl. xxxviii, fig. 3. According to Captain Atwood, the hammer-head is "seldom seen" at Provincetown.

**174. *Eulamia obscura* (LeSueur).** DUSKY SHARK. A "blue shark" is recognized by the fishermen of Massachusetts Bay, which is probably either this species or *E. Milberti*.

## Family GALEORHINIDÆ.

**175. "*Prionodon lamia*" Putnam.** Bull. Essex Inst., vi, 1874, p. 72. This species was provisionally identified by Prof. Putnam from a tooth obtained on St. Peter's Bank belonging to a fish estimated to have been at least thirteen feet in length.

**176. *Mustelus canis* (Mitch.) DeKay.** SMOOTH DOG-FISH. *Mustelus canis* Storer, Hist. Fish. Mass., 1867, p. 251, pl. xxxvii, figs. 2, 2a. This species is not unusual about Provincetown in summer, and is occasionally taken in other parts of the bay. The Essex Institute has young specimens taken off the Central wharf, Salem, in 1856.

## Family SPINACIDÆ:

**177. *Squalus acanthias* Linn.** DOG-FISH. *Acanthias americanus* Storer, Hist. Fish. Mass., 1867, p. 256, pl. xxxviii, fig. 1, 1a. Common everywhere in summer, coming up on the fishing-grounds in immense schools and very annoying to fishermen.

**178. *Centroscyllium Fabricii* (Rein.) Mull. & Henle.** GREENLAND DOG-FISH. *Centroscyllium fabricii*, Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 425. Common on the off-shore banks in company with *Centroscymnus*.

**179. *Centroscymnus cœlolepis* Bocage & Capello.** BLACK DOG-FISH. *Centrophorus cœlolepis* Günther, Catalogue Fish. Brit. Mus., viii, 1870, p. 423. This species is abundant on the off-shore banks, at the depth of 200 fathoms and more. It is ovoviviparous like *Squalus*.

## Family ECHINORHINIDÆ.

180. *Echinorhinus spinosus* (Gmel.) Blainville. SPINOUS SHARK. *Echinorhinus spinosus* Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 428. A single specimen of this species, the first seen in America, drifted ashore at Provincetown in December, 1878.

## Family SCYMNIDÆ.

181. *Somniosus microcephalus* (Bloch.) Gill. SLEEPER SHARK. *Scymnus brevipinna* Storer, Hist. Fish. Mass., 1867, p. 259, pl. xxxviii, fig. 2. *Scymnus brevipinna* was described by Lesueur in 1818 from a stuffed specimen he saw at Marblehead. Storer mentions a specimen he saw at Marblehead. Storer mentions a specimen taken off Portland, Me., in 1846, and one at Nahant, as well as three at Provincetown, in 1848-9.

## Class MARSIPOBRANCHII.

## Order HYPEROARTIA.

## Family PETROMYZONTIDÆ.

182. *Petromyzon marinus* Linn. LAMPREY EEL. *Petromyzon americanus* Storer, Hist. Fish. Mass., 1867, p. 275, pl. xxxviii, fig. 4. Occasionally seen, especially in the rivers. The Essex Institute has a specimen found clinging to a pollock in Salem market, May 25, 1858, and also young individuals from Beverly.

## Order HYPEROTRETA.

## Family MYXINIDÆ.

183. *Myxine glutinosa* Linn. HAG, SLIME-FISH. *Myxine glutinosa* Günther, Cat. Fish. Brit. Mus., viii, p. 510. Occasionally taken in deep water clinging to dead fish. The Fish Commission obtained specimens in the trawl, at 175 fathoms, forty-two miles east of Cape Ann. It was also dredged by Packard and Cooke in the "Bache," in 1873.

## ADDENDUM.

92a. *Lampris guttata* Rebz. Mr. J. Matthew Jones informs us of the capture of this European species near Sable Island, N. S.



## FAUNAL TABLES.

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The following species are known to occur in Massachusetts Bay as permanent residents or regular visitants. Those which are found near the shores and on the ordinary fishing grounds, sixty-nine in number, are mentioned in ordinary type; those which occur in the deeper parts of the Bay and are not ordinarily seen, eighteen in number, are in italics; while in the same list are included the stragglers, of which only a few specimens have been taken and whose occurrence must be regarded as accidental. Of these there are forty-six species in all, and they are enclosed in brackets.

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| 1. <i>Lophius piscatorius</i> .            | 33. <i>Melanogrammus æglefinus</i> .        |
| 2. <i>Mola rotunda</i> .                   | 34. <i>Phycis tenuis</i> .                  |
| 3. [ <i>Cirrisomus turgidus</i> .]         | 35. <i>Phycis chuss</i> .                   |
| 4. [ <i>Balistes capriscus</i> .]          | 36. <i>Phycis Chesteri</i> .                |
| 5. [ <i>Alutera Schoepfli</i> .]           | 37. [ <i>Phycis regius</i> .]               |
| 6. [ <i>Monacanthus setifer</i> .]         | 39. <i>Onos (Rhionemus) cimbrius</i> .      |
| 7. [ <i>Hippocampus antiquorum</i> .]      | 40. <i>Brosmius brosme</i> .                |
| 8. <i>Siphonostoma Peckianum</i> .         | 41. <i>Merlucius vulgaris</i> .             |
| 9. <i>Siphonostoma fuscum</i> .            | 42. <i>Lycodes Verrillii</i> .              |
| 10. [ <i>Centriscus scolopax</i> .]        | 45. <i>Zoarces anguillaris</i> .            |
| 11. [ <i>Fistularia serrata</i> .]         | 46. <i>Cryptacanthodes maculatus</i> .      |
| 12. <i>Gasterosteus aculeatus</i> .        | 47. [ <i>Eumesogrammus subbifurcatus</i> .] |
| 13. [ <i>Gasterosteus trachurus</i> .]     | 49. <i>Leptoblennius serpentinus</i> .      |
| 14. <i>Gasterosteus pungitius</i> .        | 50. <i>Leptoclinus aculeatus</i> .          |
| 15. <i>Apeltes quadracus</i> .             | 51. <i>Murænoides gunnellus</i> .           |
| 17. [ <i>Achirus lineatus</i> .]           | 52. <i>Anarrhichas lupus</i> .              |
| 18. <i>Pleuronectes glaber</i> .           | 53. <i>Anarrhichas minor</i> .              |
| 19. <i>Pseudopleuronectes americanus</i> . | 55. [ <i>Batrachus tau</i> .]               |
| 20. <i>Limanda ferruginea</i> .            | 56. <i>Cyclopterus lumpus</i> .             |
| 21. <i>Glyptocephalus cynoglossus</i> .    | 57. <i>Eumicrotremus spinosus</i> .         |
| 22. <i>Lophopsetta maculata</i> .          | 58. <i>Liparis vulgaris</i> .               |
| 23. <i>Hippoglossoides platessoides</i> .  | 59. <i>Liparis Montagu</i> .                |
| 24. [ <i>Pseudorhombus dentatus</i> .]     | 61. [ <i>Prionotus evolans</i> .]           |
| 25. [ <i>Pseudorhombus oblongus</i> .]     | 62. [ <i>Prionotus carolinus</i> .]         |
| 26. <i>Hippoglossus vulgaris</i> .         | 63. <i>Aspidophoroides monoptygius</i> .    |
| 29. <i>Macrurus Bairdii</i> .              | 64. <i>Cottus octodecemspinosus</i> .       |
| 30. <i>Gadus morrhua</i> .                 | 66. <i>Cottus scorpius grœnlandicus</i> .   |
| 31. <i>Pollachius carbonarius</i> .        | 67. <i>Cottus æneus</i> .                   |
| 32. <i>Microgadus tomcodus</i> .           | 69. <i>Centridermichthys uncinatus</i> .    |

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| 70. <i>Triglops Pingelii.</i>            | 118. <i>Hydrargyra majalis.</i>          |
| 71. <i>Hemitripterus americanus.</i>     | 119. <i>Fundulus pisculentus.</i>        |
| 72. <i>Sebastes marinus.</i>             | 127. [ <i>Scopelus Humboldtii</i> ?]     |
| 73. <i>Tautoga americana.</i>            | 131. <i>Osmerus mordax.</i>              |
| 74. <i>Tautogolabrus adpersus.</i>       | 132. <i>Salmo salar.</i>                 |
| 75. <i>Xiphias gladius.</i>              | 133. <i>Salvelinus fontinalis.</i>       |
| 76. [ <i>Trichiurus lepturus.</i> ]      | 136. <i>Clupea harengus.</i>             |
| 77. <i>Scomber scombrus.</i>             | 137. <i>Alosa sapidissima.</i>           |
| 78. [ <i>Scomber DeKayi.</i> ]           | 138. <i>Pomolobus vernalis.</i>          |
| 79. <i>Sarda pelamys.</i>                | 139. <i>Pomolobus æstivalis.</i>         |
| 80. <i>Orcynus thynnus.</i>              | 140. <i>Pomolobus mediocris.</i>         |
| 82. [ <i>Orcynus pelamys.</i> ]          | 141. <i>Brevoortia tyrannus.</i>         |
| 85. [ <i>Cybius maculatum.</i> ]         | 142. [ <i>Engraulis vittatus.</i> ]      |
| 86. [ <i>Carangus hippos.</i> ]          | 151. <i>Conger vulgaris.</i>             |
| 87. [ <i>Paratractus pisquetus.</i> ]    | 152. <i>Anguilla bostoniensis.</i>       |
| 88. [ <i>Argyrosus vomer.</i> ]          | 152. <i>Anguilla vulgaris.</i>           |
| 89. [ <i>Seriola zonata.</i> ]           | 157. <i>Acipenser oxyrhynchus.</i>       |
| 90. <i>Palinurichthys perciformis.</i>   | 158. <i>Acipenser brevirostris.</i>      |
| 91. <i>Poronotus triacanthus.</i>        | 160. [ <i>Torpedo occidentalis.</i> ]    |
| 92. [ <i>Zenopsis ocellatus.</i> ]       | 162. <i>Raia erinacea.</i>               |
| 93. [ <i>Cynoscion regalis.</i> ]        | 163. <i>Raia radiata.</i>                |
| 94. [ <i>Pogonias chromis.</i> ]         | 164. [ <i>Raia eglanteria.</i> ]         |
| 95. [ <i>Menticirrhus nebulosus.</i> ]   | 165. <i>Raia lævis.</i>                  |
| 96. [ <i>Stenotomus argyrops.</i> ]      | 166. <i>Raia ocellata.</i>               |
| 101. [ <i>Centropristis atrarius.</i> ]  | 168. [ <i>Lamna cornubica.</i> ]         |
| 105. <i>Roccus lineatus.</i>             | 169. [ <i>Carcharodon Atwoodi.</i> ]     |
| 106. <i>Morone americana.</i>            | 170. [ <i>Cetorhinus maximus.</i> ]      |
| 107. <i>Pomatomus saltatrix.</i>         | 171. [ <i>Eugomphodus littoralis.</i> ]  |
| 108. [ <i>Pseudopriacanthus altus.</i> ] | 172. <i>Alopias vulpes.</i>              |
| 109. <i>Ammodytes americanus.</i>        | 173. [ <i>Sphyrna zyæna.</i> ]           |
| 110. [ <i>Ammodytes dubius.</i> ]        | 174. [ <i>Eulamia obscura.</i> ]         |
| 111. [ <i>Echeneis naucrateoides.</i> ]  | 176. <i>Mustelus canis.</i>              |
| 112. <i>Remoropsis brachyptera.</i>      | 177. <i>Squalus americanus.</i>          |
| 113. <i>Remora jacobæa.</i>              | 180. [ <i>Echinorhinus spinosus.</i> ]   |
| 114. <i>Chirostoma notatum.</i>          | 181. [ <i>Somniosus microcephalus.</i> ] |
| 115. [ <i>Mugil brasiliensis.</i> ]      | 182. <i>Petromyzon marinus.</i>          |
| 116. <i>Belone longirostris.</i>         | 183. <i>Myxine glutinosa.</i>            |
| 117. <i>Scomberesox scutellatus.</i>     |  |

The following list includes the species known to occur in the fresh and brackish water of Essex County, thirty-seven in number, seventeen of which, having already been mentioned as inhabitants of the sea, are printed in italics.

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| 14. <i>Gasterosteus pungitius</i> .   | 123. <i>Esox americanus</i> .          |
| 15. <i>Apeltes quadracus</i> .        | 132. <i>Salmo salar</i> .              |
| 32. <i>Microgadus tomcodus</i> .      | 132a. <i>Salmo salar sebago</i> .      |
| 68. <i>Uranidea gracilis</i> .        | 133. <i>Salvelinus fontinalis</i> .    |
| 97. <i>Lepiopomus auritus</i> .       | 137. <i>Alosa sapidissima</i> .        |
| 98. <i>Eupomotis aureus</i> .         | 138. <i>Pomolobus vernalis</i> .       |
| 99. <i>Enneacanthus obesus</i> .      | 139. <i>Pomolobus aestivalis</i> ?     |
| 100. <i>Micropterus pallidus</i> .    | 141. <i>Brevoortia tyrannus</i> .      |
| 100a. <i>Micropterus achigan</i> ?    | 143. <i>Catostomus teres</i> .         |
| 102. <i>Perca fluviatilis</i> .       | 144. <i>Erimyzon sucetta</i> .         |
| 103. <i>Boleosoma Olmstedl</i> .      | 145. <i>Carassius auratus</i> .        |
| 104. <i>Boleichthys fusiformis</i> .  | 146. <i>Luxilus cornutus</i> .         |
| 105. <i>Roccus lineatus</i> .         | 147. <i>Notemigonus chrysoleucus</i> . |
| 106. <i>Morone americana</i> .        | 148. <i>Semotilus bullaris</i> .       |
| 116. <i>Belone longirostris</i> .     | 149. <i>Rhinichthys atronasmus</i> .   |
| 118. <i>Hydrargyra majalis</i> .      | 150. <i>Amiurus catus</i> .            |
| 119. <i>Fundulus pisculentus</i> .    | 152. <i>Anguilla vulgaris</i> .        |
| 120. <i>Fundulus nigrofasciatus</i> . | 157. <i>Acipenser oxyrhynchus</i> .    |
| 121. <i>Fundulus multifasciatus</i> . | 158. <i>Acipenser brevirostris</i> .   |
| 122. <i>Esox reticulatus</i> .        |  |

The following list of names, fifty-seven in number, represents the fauna of the off-shore banks. Twenty-eight species, the names of which are given in italics, have already been referred to as occurring in Massachusetts Bay. *Hippocampus antiquorum* was obtained at the surface. *Trygon centrura* is a southern straggler to the shoals of George's Banks. The remaining twenty-seven species are found only at sea, at depths of 80 to 400 or 500 fathoms, and in water colder than 38° F. Twenty-nine of the species included in this list have been added to the fauna of New England and Nova Scotia within two years by the labors of the U. S. Fish Commission.

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|---|--|
| 1. <i>Lophius piscatorius</i> .           | 27. <i>Platysomatichthys hippoglossoides</i> . |
| 2. <i>Mola rotunda</i> .                  | 28. <i>Macrurus Fabricii</i> .                 |
| 7. <i>Hippocampus antiquorum</i> .        | 29. <i>Macrurus Bairdii</i> .                  |
| 21. <i>Glyptocephalus cynoglossus</i> .   | 30. <i>Gadus morrhua</i> .                     |
| 23. <i>Hippoglossoides platessoides</i> . | 31. <i>Pollachius carbonarius</i> .            |
| 26. <i>Hippoglossus vulgaris</i> .        |  |

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|---|---|
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| 38. <i>Haloporphyrus viola.</i>         | 125. <i>Scopelus gemmifer.</i>          |
| 40. <i>Brosmius brosmæ.</i>             | 126. <i>Scopelus speculiger.</i>        |
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| 42. <i>Lycodes Verrillii.</i>           | 128. <i>Echiostoma barbatum.</i>        |
| 43. <i>Lycodes VahlII.</i>              | 129. <i>Malacosteus niger.</i>          |
| 44. <i>Lycodes paxillus.</i>            | 130. <i>Argentina syrtensium.</i>       |
| 52. <i>Anarrhichas lupus.</i>           | 134. <i>Alepidosaurus ferox.</i>        |
| 53. <i>Anarrhichas minor.</i>           | 135. <i>Alepocephalus Bairdii.</i>      |
| 54. <i>Anarrhichas latifrons.</i>       | 136. <i>Clupea harengus.</i>            |
| 60. <i>Liparis ranula.</i>              | 153. <i>Nemichthys scolopaceus.</i>     |
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| 70. <i>Triglops Pingelii.</i>           | 155. <i>Saccopharynx flagellum.</i>     |
| 72. <i>Sebastes marinus.</i>            | 156. <i>Simenchelys parasiticus.</i>    |
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| 83. <i>Orcynus alatungæ.</i>            | 165. <i>Raia lævis.</i>                 |
| 84. <i>Orcynus argentivittatus.</i>     | 167. <i>Trygon centrura. (Georges.)</i> |
| 90. <i>Patinurichthys perciformis.</i>  | 175. <i>Prionodon lamia.</i>            |
| 92a. <i>Lampris guttata.</i>            | 177. <i>Squalus acanthias.</i>          |
| 109. <i>Ammodytes americanus.</i>       | 178. <i>Centroscyllum Fabricii.</i>     |
| 112. <i>Remoropsis brachyptera.</i>     | 179. <i>Centroscymnus cœlolepis.</i>    |
| 117. <i>Scombresox saurus.</i>          | 181. <i>Somniosus microcephalus.</i>    |



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REGULAR MEETING, MONDAY, JAN. 6, 1879.

MEETING this evening. In the absence of the PRESIDENT, Dr. GEORGE A. PERKINS was requested to preside. The records of last meeting were read by the Secretary. Donations and correspondence announced.

Mr. FREDERICK A. OBER, of Beverly, occupied the evening with a paper on his ornithological explorations in the Lesser Antilles. He gave a most interesting account of his work on the Islands, and as a result of his explorations discovered eighteen new variations and species of birds. His remarks were illustrated with twenty-three photographic views, thrown on the screen by the kindness of Mr. J. W. Moulton.

The following is an abstract of the paper:—

*Ornithological Explorations of the Lesser Antilles.*

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BY FREDERICK A. OBER.

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LEAVING New York in December, 1876, I proceeded to Martinique in the centre of the chain of the Lesser Antilles; thence to Dominica, in lat. 15° north, to commence my investigations into the fauna of the Caribbee islands. The undertaking was under the auspices of the Smithsonian Institution, and for the purpose of filling a gap in the ornithological data of the West Indies.

Dominica, like all the islands, with few exceptions, of the chain, is of volcanic origin and very mountainous. It contains the highest mountain south of Jamaica (in the Antilles), "Morne Diablotin" being above 5,000 feet in height. As in the other islands, also, there are three



different *zones* of vegetation and of animal life; that of the coast, that of the higher hills and midway the mountains, and that of the mountain-tops. In the middle zone, situated (at a rough estimate) between 1500 and 2500 feet altitude occur the greatest variety of forms, both in vegetable and animal life. There the famous high woods, containing trees of the greatest magnitude, and tree ferns and tropical plants of every description, give hiding place to many birds not found along the coasts. Indeed, the coast *fauna* is very meagre, owing to the scarcity of trees and the cultivation of the sugar estates. Ascertaining that my best collecting ground would, probably, be in that region, I repaired to a mountain valley some 1500 feet above sea level, and took up my residence with some families of mixed blood (Carib and Creole) for above a month. Here I was very successful, discovering seven species and varieties not heretofore known to science. This was only accomplished by secluding myself in the mountains and in forests away from the general routes of travel.

Thence I went over the mountains to the portion of the island inhabited by the Caribs, of whom but a remnant exist of all the many thousands found by Columbus in his voyages.

I secured many photographs, a good vocabulary and many notes regarding their early history and present condition. The difference in speech between the men and women, in the ancient tongue, is very noticeable. The language spoken by them, now, is a perverted French; the *patois* or provincial, that form of speech used by the ignorant. Here I procured the imperial parrot (*Chrysotis augusta*), but not many other birds of note. The specimens of this bird which I sent the National Museum were the first seen in America.

In Antigua, two degrees north of Dominica, I found but few birds, but secured an owl which has since been declared a new species. In Barbuda, thirty miles north of Antigua, I found excellent shooting at deer, wild guinea fowls, doves, white-headed pigeons, etc., but no new or rare birds. Antigua and Barbuda differ from the other islands of the group in being wholly, or in part, of coral formation.

In St. Vincent, in lat. 13° north, I discovered, among others, the famous "Sonffrière Bird," which had been an object of interest to English naturalists for many years; since named, by Mr. Lawrence, the *Myiadestes sibilans*. To procure this, I was obliged to camp in a cave for nearly a week.

With the few Caribs residing in St. Vincent, who live isolated from the whites, in the northern part of the island, I remained a few weeks. Here, I obtained many specimens of ancient implements and photographed some curiously-incised rocks, supposed to have been used as sacrificial stones by the Caribs. A carved wooden tortoise, which I found in a cave, exhibits excellent workmanship, and may prove interesting.

In St. Vincent, I procured seven (7) new species, the most interesting, perhaps, of any obtained.

In Grenada, in lat. 12 north, I discovered three (3) new species. This island is the last of the chain, being less than one hundred miles from Trinidad and seventy miles from Tobago, the fauna of which latter islands is essentially *tropical*, and different from that of the Antillean chain. Grenada contains the last of the armadillos, which once inhabited all these islands, and monkeys.

Tobago, which I investigated later, yielded many interesting species; but, not forming one of the group known as the Antilles, it does not come within the limits of this paper.

The time occupied in the investigation was nearly two years. The results, ornithologically, were (I am assured by the officers of the Smithsonian Institution) of the greatest value, as I had sent to the museum hundreds of birds never before seen in the country and *eighteen* (18) new species and varieties.

The following is a list of the new birds, as described by Mr. Lawrence, the types of which are in our National Museum :—

FROM DOMINICA.

*Thryothorus rufescens*.  
*Dendroeca plumbea*.  
*Myiarchus Oberi*.  
*Vireosylvia calidris* (var. *Dominicana*).  
*Strix flammea* (var. *nigrescens*).  
*Chætura Dominicana*.  
*Blacicus brunneicapillus*.

FROM ST. VINCENT.

*Turdus nigristrostris*.  
*Myiadestes sibilans*.  
*Thryothorus musicus*.  
*Certhiola atrata*.  
*Certhiola saccharina*.  
*Leucopezza Bishopi*.  
*Calliste versicolor*.

FROM GRENADA.

*Turdus caribbæus*.  
*Thryothorus Grenadensis*.  
*Quiscalus luminosus*.

FROM ANTIGUA.

*Speotyto amaura*.

Catalogues of each island have been prepared by Mr. Lawrence from my notes, and are in course of publication.

At the close of the evening, on motion of Mr. Caleb Cooke, a vote of thanks was unanimously passed to Mr. Ober for the paper read.

*A List of the Birds of the Hudson Highlands, with  
Annotations.*

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BY EDGAR A. MEARNS.

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[Continued from Vol. X, page 179.]

Family, **SITTIDÆ.**

**12. *Sitta carolinensis*, Gmelin.** WHITE-BELLIED NUTHATCH. Perhaps a resident species, though not found breeding just in this neighborhood. Farther up the Hudson, at Catskill, they breed abundantly. Their occurrence is somewhat irregular, like that of the Brown Creeper and the Cedar Bird; but they are usually common except during the breeding season, when they, seemingly, all withdraw for a short time. It is a remarkable fact, that not a single White-bellied Nuthatch was seen here, by any one, to my knowledge, between August, 1872, and the following July. Mr. Erwin I. Shores mentions a similar incident in the case of the Common Bluebird.<sup>1</sup> He states that he "could not find it in 1872,"<sup>2</sup> about Suffield, Conn. Mr. W. C. Osborn discovered a nest of this Nuthatch, near Catskill, N. Y., the entrance to which was through an aperture in a weather-board, in the house of Mr. Frederic E. Church, the celebrated artist.

The Nuthatch is an eminently useful and industrious bird. He devotes his entire existence to the occupation of scrambling about upon the tree-trunks, grubbing out insects from their hiding places under the bark. At this commendable, but somewhat prosaic, employment he spends his days; and when night comes, he betakes himself to a hole in some tree, where, weary with his day's toil, he sleeps the sleep of the just till day-break; nor is our pretty friend addicted to the disagreeable practice of early rising. He depends not upon craftiness for his daily sustenance, but gets it by the sweat of his brow; therefore he indulges in a morning nap after the sun is up, and the nocturnal worm is permitted to crawl safely into its den. Doubtless this interesting bird should command our highest respect, and our deepest gratitude; for his life is one of tireless industry and great usefulness. Nor, indeed, should we question the personal motives which impel him to the accomplishment of such important and valuable results.

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<sup>1</sup> C. Hart Merriam, *A Review of the Birds of Conn.*, p. 8, 1877.

<sup>2</sup> Mr. Shores informs me that the date here given is incorrect; should read 1873.



Though the Nuthatch does not possess the gift of song, still he is well and favorably known to most persons who live in the country—whose lines have fallen in pleasant places. He is found wherever there are forests, and comes into our orchards and about our dwellings. Moving steadily in any direction upon the tree-trunks and branches, he searches the interstices of the bark, tapping hard upon suspected spots with his bill. At frequent intervals he utters his peculiar cry, a sort of nasal *hōnk hōnk*. When moving downward, he always advances head first, and never in the opposite position, as the Woodpeckers do. Sometimes his diet is slightly varied. He never refuses raw meat; and when in Lewis County, N. Y., during the latter part of December, 1877, I found him eating the beech-nuts, in company with the Red-headed Woodpeckers, and with evident enjoyment. The stomachs of the specimens shot were found distended by those nuts.

Sometimes, during storms, in winter, the trees become so thickly coated with ice, that the Woodpeckers and creeping birds, since nature has neglected to supply them with adjustable ice-spurs suitable for such emergencies, are unable to climb upon the icy trees, and, consequently, are obliged to desist from their usual avocations, and betake themselves to other situations in quest of food. On such occasions the Nuthatches seem to be particularly distressed, flying about uttering loud cries, and alighting freely upon the roofs of buildings. Both this species and the Red-bellied Nuthatch have a loud, coarse rattle as the mating season approaches, which is seldom heard at other times.

*Dimensions.*—Average measurements of eight specimens: length, 6·07; stretch, 11·03; wing, 3·48; tail, 1·92; culmen, ·76; gape, ·90; tarsus, ·70.

**13. *Sitta canadensis*, Linné. RED-BELLIED NUTHATCH.** The movements of this species are extremely uncertain; but it may be set down as an irregular winter resident, and an occasional visitant at other seasons, except during the period of its nidification. Generally abundant during its autumnal migration. At times it is gregarious; and this is especially the case in the fall.

Late in summer the Red-bellied Nuthatches arrive in large flocks, some seasons, while in others they are not seen at all, or only occasional individuals. These migrating flocks appear late in August, and a few are sometimes observed by the first of that month. They remain with us for a period varying from a few days to several weeks. In 1874, they were very numerous from August 25 to September 23. They search the tree trunks for their insect prey, in large, straggling bands, uttering a note somewhat resembling the cry of the other species (*S. carolinensis*); but it is pitched much higher, and varied

by low, lisping, wiry notes, which are only audible at a short distance. They are partial to the groves of red cedar, but are frequently found, in flocks, in the deciduous woods; there they are generally attended by numbers of small flycatching birds, chiefly of the genera *Vireo* and *Empidonax*, which follow, apparently for the purpose of capturing the insects which are roused from the bark. They are of irregular occurrence throughout winter. Were very abundant in March, 1874, when large flocks were seen amongst the pine trees, along the Hudson, chasing each other through the forest with loud, rattling cries, and rollicking together in a most joyous and uncreeper-like manner.

*Dimensions*.—Average measurements of nine specimens: length, 4.62; stretch, 8.22; wing, 2.66; tail, 2.58.

#### Family, **CERTHIDÆ.**

**14. *Certhia familiaris*, Linné.** BROWN CREEPER. An abundant, but somewhat irregular winter resident, and indeed is found commonly throughout the year, except during the nestling period, during which none have been observed, though it remains till late in May. The Creeper is partial, in winter, to the evergreens, as indeed are most of our small wintering birds. It possesses, besides the usual prolonged, wheezy note of which the species is by no means chary, a variety of feeble, chirping utterances, resembling those of the Golden-crested Kinglet. The Creeper is usually a tame bird, paying less heed to its admirers than to the capture of insects that infest the bark of trees; that being the main purpose of its life. With that object in view, it alights at the base of a tree and begins to ascend in a spiral; in this manner it advances till the trunk and principal branches have been explored, when, having reached the top, it spreads its wings and with a pretty, sweeping movement, attaches itself to the extreme base of another tree, when the same performance is repeated. Thus the Creeper has many ups and downs in its life, though, on the whole, its is a monotonous career of labor; but in spite of this the bird is interesting, and its habits have a certain fascination. Its sombre colors serve an excellent purpose for concealment, matching so well those of the trees upon which it lives as to make it very inconspicuous.

Its long, slender, curved bill seems ill adapted as a means of musical expression; and indeed I never suspected it of possessing such attributes, until I one day discovered that it was the author of a very pleasant song. This happened on April 1, 1878, when I heard a sweet warble, moderately loud, that puzzled me as to its authorship, until I at length saw the bird singing, quite close to me, as it clung to the side of a tree. Like the Nuthatches and Titmice, it is fond of raw

meat, and may be attracted to houses by suspending a scrap of pork from the balcony.

*Dimensions.*—Average measurements of eighteen specimens: length, 5·66; stretch, 7·98; wing, 2·56; tail, 2·65; culmen, ·63; tarsus, ·53.

#### Family, **TROGLODYTIDÆ.**

**15. Troglodytes domesticus, Bartram.** HOUSE WREN. A summer resident; abundant. Like the Bluebirds, they like to build in the fruit cans that I have placed in appropriate places for their use. As many as twelve pairs have nested upon the place at once. Nothing could present a greater contrast than the habits of these birds during the breeding season and afterwards. Having successfully completed the business of rearing several broods of young, they lose, simultaneously, their delicious song and the pert, saucy familiarity which characterizes their actions during their stay in close proximity to man; retiring with their families to the remotest wastes, they spend the residue of the season amongst the broken rocks, covered thickly with bushes and matted vines, seldom appearing in view, but constantly announcing their whereabouts by a sharply enunciated, seemingly discontented or anxious *chirp*.

These Wrens arrive from the South late in April (28, 1873; May 7, 1874; 6, 1875; April 29, 1876; May 9, 1877; April 30, 1878; 29, 1879), and remain till the middle of October (16th, 1876).

*Dimensions.*—Average measurements of seven specimens: length, 5·00; stretch, 6·61; wing, 1·97; tail, 1·71; bill from nostril, ·36; tarsus, ·66.

**16. Anorthura troglodytes, var. hyemalis, (Wilson).** WINTER WREN. A winter resident; very abundant during its autumnal migration; generally quite common all winter, but somewhat irregular; arrives the first of October (4, 1874; September 29, 1876; exceedingly abundant October 8), and departs the last of April (27, 1874; 30, 1875; May 1, 1876). Mr. E. P. Bicknell informs me that he has observed it, as far south as Riverdale, on May 4, 1877.

These active, sprightly little birds are fond of searching amongst broken rocks, brush-heaps, and rubbish generally; but it is their greatest delight to run about under ice, after the water has settled away; creeping into every nook and crevice in search of food, they sometimes remain out of sight for many minutes together. They are often found on the marshes, amongst the cat-tails, and frequenting the piles of *débris* that the tides have floated upon their edges; here, skulking out of sight, but close to the observer, and always emitting a sharp *chirp*, they would exhaust the patience of the mildest collector extant, who would shoot one for his cabinet.



*Dimensions.*—Average measurements of seven specimens: length, 4·06; stretch, 6·15; wing, 1·89; tail, 1·24; bill from nostril, 35; tarsus, 73.

**17. *Telmatodytes palustris* (Bartram).** LONG-BILLED MARSH WREN. A common summer resident; breeds in the marshes bordering the Hudson. Arrives about the middle of May (21, 1875; 18, 1876; 21, 1877; 4, 1878), and remains till October (1, 1874; September 28, 1876; 23, 1878). This species has the habit of singing at night, when the moon is bright. Its eggs, six to eight in number, are deposited about the first of June. They are of a deep mahogany color; sometimes a light colored egg is found in the same clutch. The nest is spherical, with a round orifice for entrance at the side. It is attached to the reeds of the salt marshes, and is constructed partly of these same flags ("cat-tail," *Typha latifolia*, Linn.), and partly of the marsh grasses; the interior lined with the down of the flag. The eggs are kept covered till the full complement has been laid; possibly as a protection against snakes. They breed at least twice in a season, occupying a fresh nest each time. I examined several nests, on Consook Island, which contained fresh eggs, as late as July 20, 1878. These were probably third broods. The House Wrens left our piazza with their third brood August 15.

The Marsh Wrens live in colonies, and are as attractive, merry little birds as you could wish to see; scolding hard when their retreats are invaded, but singing a joyous, happy refrain the moment you pass on. Even when scolding most irately, you may hear them, between times, trying to swallow the gurgling notes that seem to well forth spontaneously and against their wills. There are few sounds so cheerful and pleasant to hear as the jingling melody produced by a colony of Marsh Wrens left in quiet (?) possession of their oozy territory, after such a disturbance.

*Dimensions.*—Average measurements of seven specimens: length, 5·20; stretch, 6·52; wing, 1·95; tail, 1·68; bill from nostril, 42; tarsus, 81.

#### Family, **ALANDIDÆ.**

**18. *Eremophila alpestris*, (Forster).** HORNED LARK. Mr. Jas. S. Buchanan, of Newburgh, informs me that this species often occurs about Cornwall and Newburgh. None of the other collectors have met with it in the Highlands, as most of the region is unsuited to its wants.

#### Family, **MOTACILLIDÆ.**

**19. *Anthus ludovicianus*, (Gmelin).** AMERICAN PIPIT; TIT-LARK. Occasionally seen during its migrations. Messrs. William K.



Lute, and Thos. W. Wilson, found large flocks on the salt meadows connecting Constitution Island with the east shore, in October, 1875. I saw a large flock, at Fort Miller, Washington County, N. Y., on November 9, 1876.

*Dimensions*.—Length, 6·38; stretch, 10·25; wing, 3·50; tail, 2·69; culmen, ·47; tarsus, ·81.

#### Family, SYLVICOLIDÆ.

**20. *Mniotilta varia*, (Linné).** BLACK AND WHITE CREEPING WARBLER. A common summer resident; breeds; particularly numerous during the spring migrations. Arrives the first of May (8, 1873; 4, 1874; April 30, 1875; May 3, 1876; April 30, 1877; 26, 1878; 26, 1879), and remains till October (14th, 1876).

The Black and White Creepers are interesting little birds, that spend the greater part of their time in creeping upon the trunks and branches of trees, somewhat after the fashion of the Brown Creeper. When first arrived, in spring, they sing a feeble refrain; but, a little later, when the full tide of migration has set in from the South, the Creepers may be seen perched upon the highest tree-tops, singing a very sweet little ditty, almost exactly like the song of the Redstart (*Setophaga ruticilla*). After this matin performance they drop down upon the tree-trunks, and creep about them in spirals in search of insects, uttering a low, inward note; hopping out to the extremity of a branch, they will amuse themselves with flying out in short curves after insects. They sometimes inhabit swampy thickets, doubtless attracted thither by the abundance of insects; their presence there may be detected by the utterance of certain harsh, screeching notes that are peculiar to itself.

Their nest is placed upon the ground; generally sheltered by a projecting rock, or stump. A pair once nestled close to my house. The nest, built upon a bed of leaves, sheltered by a jutting rock, was composed of strips of grape-vine bark, stems of plants, and grasses, loosely felted. The parents were very gentle, and seemed to apprehend from my frequent visits no greater misfortune than a temporary separation from their little ones. The young were five in number. I watched them developing until their parents taught them, first, to climb upon a neighboring grape-vine, and afterwards to attempt short flights from branch to branch; soon they were strong enough to leave their natal spot, and rambled through the woods together,—a happy, rollicking, unbroken little family.

*Dimensions*.—Average measurements of sixteen specimens: length, 5·30; stretch, 8·54; wing, 2·73; tail, 2·02; bill from nostril, ·37; gape, ·60; tarsus, ·67; middle toe, ·50; its claw, ·18.

**21. *Parula americana*, (Linné).** BLUE YELLOW-BACKED WARBLER. Exceedingly numerous during migrations; a few breed. I have never discovered its nest, but am indebted to Mr. W. C. Osborn for a very young bird, shot near his residence, on the opposite bank of the Hudson, in Putnam county, where its nest was previously discovered, as recorded by DeKay in the Zoology of New York, Part II, p. 97. Giraud also observes:<sup>3</sup> "I am informed that its nest has been found at the Catskill Mountains."

It arrives early in May (12, 1874; 12, 1875; 5, 1876; 11, 1877; April 27, 1878; May 8, 1879), remaining till October (8, 1874; 8, 1876). I have heard quite a varied and pleasing song from this little bird; but succeeded by a rapid succession of harsh, filing notes.

*Dimensions.*—Average measurements of seventeen specimens: length, 4.73; stretch, 7.54; wing, 2.40; tail, 1.76; bill from nostril, .32; gape, .54; tarsus, .68; middle toe, .40; its claw, .16.

**22. *Helminthus vermivorus*, (Gmelin).** WORM-EATING WARBLER. A rather common summer resident; breeds. Arrives about the middle of May (15, 1875; 9, 1876; 11, 1878; 8, 1879), and remains through the summer.

There is a singularity about every attitude and movement of this bird, that at once attracts attention. Chiefly seen upon the ground, scratching amongst the leaves, and uttering a sharp chirp at intervals, it suddenly surprises you by flying high up among the branches in pursuit of a moth; then it alights upon a branch, and makes quite a successful attempt at a song; later, you may see it climbing upon the body of a tree, apparently as much at home as a Nuthatch would be; it even pauses occasionally to utter a few feeble notes of a song. It is sometimes found in the open woods, on its first arrival from the South; but later, when it has settled to its summer quarters, it is seldom seen outside of its favorite swampy thickets, where it breeds and passes the summer. Wet places, grown up to huckleberries,—just such spots as delight the Woodcock—are its usual resorts. Its note is sharp and metallic; and the bird is shy and difficult to capture.

*Dimensions.*—Average measurements of ten specimens: length, 5.51; stretch, 8.75; wing, 2.78; tail, 2.05; bill from nostril, .39; gape, .64; tarsus, .70; middle toe, .50; its claw, .18.

**23. *Helminthophaga pinus*, (Linné).** BLUE-WINGED YELLOW WARBLER. A summer resident; breeds. I found a nest, built in a tussock of grass, on Constitution Island, in the Hudson River. I saw another set of eggs, taken in a similar situation and said to be those of a "yellow bird," which agree very well with the eggs in my collection; but they may be those of the Nashville Warbler (*H. ruficapilla*).

<sup>3</sup> Birds of Long Island, p. 60, 1844.

It arrives about the middle of May (12, 1875; 17, 1877), and spends the summer. John Burroughs mentions<sup>4</sup> the occurrence of this species at Highland Falls, and Giraud observes:<sup>5</sup> "the present species has been shot during summer on the Catskill Mountains, and it is not improbable that it breeds there; it has been shot in Rockland County, and other parts of the State of New York, but seems to be nowhere abundant." At Riverdale, on the Hudson, Mr. E. P. Bicknell says<sup>6</sup> it is "common during the summer, and regularly breeding." Dr. A. K. Fisher has taken its eggs at Sing Sing, N. Y. It thus appears that the species is a summer resident along the Hudson, as far as Catskill.

*Dimensions.*—Measurements of male: length, 4·85; stretch, 7·30; wing, 2·46; tail, 1·90; bill from nostril, ·35; tarsus, ·66. Female: length, 4·80; stretch, 7·24; wing, 2·25; tail, 1·77; bill from nostril, ·35; gape, ·55; tarsus, ·68; middle toe, ·38; its claw, ·15.

**24. *Helminthophaga chrysoptera*, (Linné).** BLUE GOLDEN-WINGED WARBLER. A summer resident. Arrives from the South early in May (12, 1875; 10, 1878; 15, 1879). This species is a regular spring migrant; and doubtless passes considerably farther to the northward. The insect-like notes of this bird, once heard, are not apt to be forgotten; both it, and the preceding, are usually found in swampy thickets.

*Dimensions.*—Average measurements of five specimens: length, 5·10; stretch, 8·05; wing, 2·46; tail, 1·94; bill from nostril, ·34; gape, ·57; tarsus, ·70; middle toe, ·42; its claw, ·16.

**25. *Helminthophaga ruficapilla*, (Wilson).** NASHVILLE WARBLER. A very common spring and fall migrant, and rare summer resident. Arrives early in May (11, 1874; 11, 1875; 6, 1876; 13, 1877; 10, 1878; 8, 1879), departing late in September (21, 1874; 20, 1875; 16, 1876). In spring it is very abundant in fruit orchards, flitting among the blossoms; but in autumn, when it is abundant from the first to the twentieth of September, it is usually seen skipping about in the tree tops; in summer it retreats to swampy wildernesses, there to breed. I have not discovered its nest; but Dr. Clinton L. Bagg has taken its eggs at Poughkeepsie, on the Hudson.

*Dimensions.*—Average measurements of sixteen specimens: length, 4·77; stretch, 7·45; wing, 2·33; tail, 1·81; bill from nostril, ·28; gape, ·48; tarsus, ·67.

**26. *Helminthophaga celata*, (Say).** ORANGE-CROWNED WARBLER. A rare migrant. "On May 13, 1875, I shot a beautiful male of this rare species, as it was skipping among the apple blossoms, close

<sup>4</sup> Wake-Robin, p. 22, 1871.

<sup>5</sup> Birds of Long Island, p. 67, 1844.

<sup>6</sup> Bull. Nutt. Orn. Club, Vol. III, p. 130, 1878.



to my house, in company with a little band of Warblers which may have belonged to the same species."<sup>7</sup> Mr. E. P. Bicknell observes: "A female was taken [at Riverdale, on the Hudson] on October 9, 1876, and a second specimen seen on the 29th of the same month. The former bird was shot while gleaning among the withering blossoms of a patch of golden-rods (*Solidago*), while the latter was hopping about in a clump of leafless briars and shrubbery quite unsuspectingly, allowing an approach of a few feet."

*Dimensions*.—Measurements of No. 667 ♂, Highland Falls, N. Y., May 13, 1875, E. A. M.: length, 4·69; stretch, 7·25; wing, 2·22; tail, 1·85; bill from nostril, ·30; tarsus, ·69.

**27. *Helminthophaga peregrina*, (Wilson).** TENNESSEE WARBLER. A rather rare migrant; sometimes abundant in autumn. In spring a few are seen, generally in company with *H. ruficapilla*, disporting themselves among the fruit blossoms. In autumn they are sometimes found abundantly, along the river banks, in the willow trees. I found large flocks in the willow swamps, on Iona Island, and on Consook Island, in September, 1876.

*Dimensions*.—Average measurements of four specimens: length, 5·00; stretch, 7·68; wing, 2·63; tail, 1·69; bill from nostril, ·32; tarsus, ·65.

**28. *Dendroeca æstiva*, (Boddart).** YELLOW WARBLER; SUMMER YELLOWBIRD. A summer resident; not very abundant; breeds. Arrives early in May (12, 1875; 12, 1876; 17, 1877; 9, 1878), and remains till autumn (September 3, 1874).

*Dimensions*.—Average measurements of seven specimens: length, 5·10; stretch, 7·78; wing, 2·40; tail, 1·89; bill from nostril, ·33; tarsus, ·74.

**29. *Dendroeca virens*, (Gmelin).** BLACK-THROATED GREEN WARBLER. A summer resident; very abundant during its migrations; a few remain and breed. Arrives early in May (16, 1874; 11, 1875; 1, 1876; 12, 1877; 9, 1878; 7, 1879), and departs late in October (21, 1874; 28, 1876). It is found everywhere, in all kinds of woods; but it is especially numerous in hemlocks growing among deciduous trees. It is seen, in large companies, clinging to the tips of the branches, exhibiting a fluttering of wings and incessant activity. Its attitudes and notes remind one of the Titmice; but it possesses a very pleasant song, besides. Not rare in summer.

*Dimensions*.—Average measurements of twenty-six specimens: length, 5·10; stretch, 7·72; wing, 2·46; tail, 1·99; bill from nostril, ·25; gape, ·55; tarsus, 68; middle toe, ·40; its claw, ·16.

<sup>7</sup> Bull. Nutt. Orn. Club, Vol. III, p. 46, 1878.

<sup>8</sup> Bull. Nutt. Orn. Club, Vol. IV, p. 61, 1879.



**30. *Dendroica caerulescens*, (Linne). BLACK-THROATED BLUE WARBLER.** An exceedingly common spring and fall migrant; not seen in summer. Arrives early in May, and remains till late in the month (May 7 to 22, 1875; 9 to 23, 1876; 12 to 18, 1877; 4 to 18, 1878; 7, 1879); in autumn it appears early in September (11, 1876; 24, 1877; 23, 1878), and departs in October (5, 1874; 17, 1876). The males arrive from the South before the females. The latter do not make their appearance in considerable numbers for several days after. This beautiful species possesses the flycatching habits of the Blackburnian Warbler (*D. blackburnia*), flying in short curves after insects, often alighting upon the sides of trees, and equally at home upon the ground or in the highest tree-top.

On the 15th of October, 1876, we were visited by a heavy fall of snow, which, at that early season, must have been as unwelcome to the birds as it was unexpected by ourselves. The apple trees, loaded with their beautiful fruit and dark green leaves, were bent low down under a weight of snow, while the foliage on the mountains, still glowing in all the beautiful tints of autumn, blended its gorgeous hues with the burdening snow flakes. Several of our summer Warblers were still present; and, among them, this species and the Black-throated Green; both of these came close about the house, and endeavored to enter at the windows: a common habit with the Yellow-rump (*D. coronata*).

*Dimensions.*—Average measurements of twenty-eight specimens: length, 5.28; stretch, 7.96; wing, 2.52; tail, 2.06; bill from nostril, .29; gape, .55; tarsus, .74; middle toe, .45; its claw, .17.

[TO BE CONTINUED.]

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# BULLETIN

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*The Solar Eclipse of 1878; a lecture before the Institute.*

BY WINSLOW UPTON,

ASSISTANT AT HARVARD COLLEGE OBSERVATORY.

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*Ladies and Gentlemen:*—A well known astronomer, who devotes much of his time to studying the appearance of the sun, recently remarked that in his opinion the sun was the most important subject for scientific study. Its position as the centre and controlling power of so many celestial bodies places it at the centre also of astronomical science, while its intimate connection with life upon the earth renders especially important any knowledge that we may acquire of its physical constitution. The great interest taken in this study during the last twenty years has added much to our knowledge, and it is a singular fact that this advance has been largely due to observations made during eclipses of the sun, when that body has been wholly concealed from view. Thus, the spectroscopic discoveries made in the eclipse of 1868 and immediately after, greatly modified the prevailing theories of its constitution. The mere passage of the moon

between the earth and the sun not only produces a scene of gorgeous beauty, but also enables us to study the immediate vicinity of the sun unhindered by the glare of sunlight. To take advantage of this, expeditions are organized and carefully equipped to make the desired observations. The questions naturally arise, what are the objects of these observations, how are they made, and what are the results obtained. These we shall endeavor to consider, especially as illustrated by the Total Eclipse of last summer.

We can show by the map the path of the eclipse. Beginning in Siberia it crossed Behring's Straits, and proceeded through Alaska and British America to the United States, which it crossed in a southeasterly direction from Washington Territory to Texas. The moon's shadow finally left the earth in the ocean. It will be seen that the path was not through a populous country, being almost directly over the extent of the Rocky Mountains. Denver is the only large town in the path. But as the country traversed is so lofty, the observations were made under peculiarly favorable atmospheric conditions. No observations were made north of the United States as far as known. Within the United States it was considered neither safe nor expedient to send parties north of the Union Pacific R. R., but the surveying party of Prof. Hayden, which was near the Yellowstone Park, made observations there. At the stations of the U. P. R. R. within the line of totality were several well equipped parties; in Colorado there were a great many. Three of the highest peaks of the Rocky Mountains had parties on their summits. In Texas several parties were located.

The width of the path was about 116 miles; the duration of totality less than three minutes. In an eclipse, the width of the shadow and the duration of the total

phase depend upon the relative size of the sun and moon. The duration of totality is simply the time occupied by the moon in passing over the excess of its own apparent diameter over that of the sun. As the sun and moon have nearly the same apparent diameter, the total phase can never occupy but a few minutes ; in the most favorable case, when the sun is farthest away and the moon nearest to the earth, the duration of totality is less than eight minutes. The greatest width of the shadow is 160 miles.

The establishing of a temporary observatory for observing an eclipse is a work of much labor. Of course, if a person wishes simply to examine the general appearance of the spectacle with a portable telescope, it will not take him long to get ready. But if an extensive series of observations has been planned, the preparations will be of corresponding extent. The instruments will include telescopes of various kinds, some of which must be mounted with great firmness ; others, such as meridian instruments, in a particular position to be determined by observations of the stars. If spectroscopes are to be used, they must be properly adjusted. If photographic work is attempted, the preparations become still more complicated, for to secure the best results the instrument must move by clock work to correspond with the motion of the sun. It requires, too, a great deal of ingenuity to utilize the rough means at the disposal of a scientific party in the field. The man who can make boards, spikes and dirt answer the purpose of stone and mortar, or who can fit instruments together without either tools or materials for his work, is a valuable member of the party. The best equipped party near Denver, that of Prof. Young of Princeton, made an astronomical camp for their observations, and their instruments shared the rough



luxuries of camp life. A magnificent telescope, which at home would be securely mounted on a pier of masonry and shielded by a revolving dome, was here perched upon a wooden framework which was sunk several feet into the ground and filled with sand to secure greater steadiness. It was, however, the proud possessor of a house which could be rolled over it for its protection, while its less fortunate companions were summarily taken off their mountings and carried to a place of shelter when the daily thunder storms were seen approaching. The party sent out by the U. S. government in charge of Prof. Stone of the Cincinnati Observatory, to which I was attached, located upon a ranch on the plains east of Denver. We were fortunate in finding a cattle shed, which we transformed into a temporary observatory. In this lonely spot, for the nearest village consisted of a railroad shed and a dug-out, we were obliged to adapt ourselves to a variety of situations. We were masons, carpenters, architects. We were surveyors, electricians, chronometer repairers. On the day of the eclipse, seated upon empty boxes with recording implements and spare eyepieces on a neighboring plank, we made our observations as comfortably as one could wish.

The observations connected with an eclipse begin several days before the expected event. For besides the adjusting of instruments and practice in using them, it is necessary to determine the geographical position of the observing station and the errors of the time-pieces used. For one use of eclipses is to correct the places of the moon given in the lunar tables. It is a mistake to suppose, as many do, that the motions of the heavenly bodies are so well determined that an eclipse can be predicted with absolute certainty for a century in advance. As Prof. Newcomb has remarked, "it is an extraordinary

intellectual feat that the path of an eclipse can be marked out at all before the event is to occur." A slight error in the position of the moon would cause a large difference in the path of the shadow on the earth. "In point of fact, the time of the late eclipse as predicted was nearly half a minute in error, while the actual path of the shadow was some ten miles from the predicted one." In order to obtain the errors of the eclipse calculations, it is customary for the observers to note the time when the moon first notches the limb of the sun, the duration of totality and the time of last contact. When these are collected together from the different stations of observation, they are used to correct the lunar tables. That this may be done, the errors of the chronometers used and the latitude and longitude of each station must be known. Observations for time and latitude are usually made with a sextant as is done at sea, or still better by a portable transit instrument such as surveying parties or watch-makers use. If a place whose latitude and longitude are known is near by, the position of the observing station may be referred to it by the methods used in surveying. If there is telegraphic connection with a place whose position is known, clock signals may be sent from one to the other, and the difference in time which is the same as difference in longitude be easily determined. At all the eclipse stations connected with the Western Union telegraph lines, the clock signals from Washington were received on several days, which was of great advantage.

Some of the observers made extensive observations during the partial phase, by measuring the angle which the line joining the cusps makes with the apparent path of the sun from east to west, which can also be used for correcting the moon's place. A series of photographs is sometimes taken for the same purpose. As it takes about

an hour for the moon to advance over the sun till it completely conceals it,—time which is of little use for other purposes,—there is an excellent opportunity for such observations. This is one use of eclipses. Formerly it was considered the only scientific way to observe the phenomenon. Dr. Bowditch, who observed the eclipse of 1806 in Salem, devotes his report entirely to the corrections to the moon's place determined by his own and others' observations. He simply mentions the fact that a luminous appearance surrounded the moon, as had been noted in previous eclipses.

But this "luminous appearance" is now the most interesting object of an eclipse, and the invention of new instruments unknown to the great mathematician makes it possible to study it with success. The special features of the total phase of an eclipse, I need not remind you, are the corona or halo of light surrounding the eclipsed sun and the solar prominences which seem to be clinging to the limb of the moon. Upon the blackboard is a representation of the corona as it appeared in a telescope of  $5\frac{1}{4}$  inches aperture. The northern and southern portions were separated into distinct beams of light, curving on each side from the north and south line; the eastern and western portions were radiated in structure, but not divided into distinct beams. There was one beam on the western portion which seemed to cross the radiated structure curving towards the south. The star  $\delta$  Coronæ shone brightly through the corona.

The solar prominences were not conspicuous in this eclipse. In the eclipses of 1860 and 1870 they were very abundant. In 1860 the largest one was found to be nearly 100,000 miles high or one-ninth of the sun's diameter. In that eclipse, it was proved that they belonged to the sun and not to the moon, as the latter passed over

them in its advance. In the eclipse of 1868, the spectro-scope showed that the solar prominences are immense masses of gaseous matter at a high temperature thrown up from the sun, hydrogen being the leading component. A few days after the eclipse, two different observers succeeded in obtaining their spectra in full sunlight, and now not only can their spectra be obtained on a clear day, but the prominences themselves are made visible.

[A spectroscope was here exhibited and its construction explained.]

Solid bodies, if sufficiently heated, give a continuous spectrum, that is a band of light with colors varying from red on one end to violet on the other. Gases give not continuous spectra, but bright lines peculiar to each gas, whose positions for many substances have been carefully mapped for reference. The sun gives a continuous spectrum crossed by dark lines, several thousand of which have been observed. It was discovered long ago that some of the dark lines corresponded in position with the bright lines of certain gases, which led to the conjecture that there was some connection between them. But in 1859, the famous Kirchoff found that by passing the light from incandescent lime, which gives a continuous spectrum, though the sodium flame, which gives a bright yellow line, he obtained the continuous spectrum with a *dark* line in place of the bright one. He also found that by using the solar spectrum combined with that of the sodium flame, a conspicuous dark line in the yellow of the solar spectrum could be made bright or dark by varying the intensity of the sunlight. He thus established the fact that the dark lines in the sun indicate the presence of gaseous substances surrounding a glowing body probably solid; at least it gives a continuous spectrum like a heated solid. He soon found that the bright lines



of the gas of iron, over 400 in number, had their counterpart in dark solar lines, and from that time the presence of various other substances in a gaseous state has been detected. The method of using the spectroscope is simply to examine the spectrum of any substance and compare it with known spectra.

The truth of the theory that the sun is a vast globe probably solid at an immense heat, surrounded by a gaseous layer, has received wonderful confirmation in recent eclipses. If the dark lines in the solar spectrum are merely the bright lines of certain gaseous substances made dark by the presence of the glowing body behind them, it must follow that just before totality, when the moon has wholly concealed the body of the sun but not the gaseous layer, the dark lines should become bright. The reversal of the lines, looked for without success in 1869, was seen in 1870 by Prof. Young, who thus describes the phenomenon:—

“Very soon as the crescent grew narrower, . . . . the dark lines of the spectrum and the spectrum itself faded away; until all at once, as suddenly as a bursting rocket shoots out its stars, the whole field of view was filled with bright lines more numerous than one could count. The phenomenon was so sudden, so unexpected, and so wonderfully beautiful as to force an involuntary exclamation. Gently and yet very rapidly they faded away, until within about two seconds, as nearly as I can estimate, they had vanished.” This phenomenon has been seen by many observers in recent eclipses.

As the solar prominences can now be examined upon any clear day, they receive less attention during eclipses than the corona, which in the present state of science is only visible at such times. The coronæ of different eclipses are so dissimilar in appearance, and the results

of different observations are so discordant, that the phenomenon is still a great mystery. Accordingly at the last eclipse it was studied in every way that human ingenuity could devise. Some observers simply examined it with the naked eye, estimating its shape, structure, and extent. Some used telescopes of varying size for the same purpose. Others confined their attention to particular portions only. The resources of the physical laboratory were brought into full use. Its light was examined with spectroscopes and polariscopes. Mr. Edison invented a special instrument called a tasimeter to measure its heat; it was successful in showing the presence of heat, but being adjusted too delicately, since the inventor did not know how much heat to expect, the index was thrown beyond the limits of the measuring scale, so that the amount of heat was not determined. The best photographic skill was also employed, and the corona which was first photographed in 1869 was again successfully photographed, the times of exposure varying from two to one hundred and sixty seconds. The camera was also used in combination with the spectroscope and polariscope, and Dr. Draper succeeded in photographing the spectrum of the corona, which had never been done before.

The polariscope enables us to determine at least partially whether the corona shines with its own or with reflected light. The explanation of the phenomenon of polarization is briefly this: We can imagine that through a beam of light coming directly to the eye, planes are passed in every direction, the beam of light being the common axis for all the planes. If however the light does not come directly to the eye, but is reflected from some surface, it is no longer possible to pass planes in every direction through the reflected beam; for the vibra-

tions are now confined to one plane, that passing through the source of light, the reflecting surface and the eye. This is termed the plane of polarization, though the vibrations themselves are at right angles to this plane. While the eye cannot of itself detect this change in the light, there are certain substances which make it apparent. Thus the Nicol prism, which consists of two prisms of Iceland spar cemented together by Canada balsam, will allow light to pass through it in one plane only. If now it is true that the vibrations in a reflected beam of light are confined to one plane, when this plane coincides with the plane in the Nicol prism in which light can pass, light should be seen; but if the prism is turned so that its plane does not coincide with the plane of polarization, darkness should be the result. And this is found to be the case, or would be if the polarization were complete. There are more delicate instruments than the Nicol prism, *e. g.*, the Savart polariscope which will show polarization if it exists in only four or five per cent. in the light examined. Polarization is not found in direct light, but is found in reflected light. The light of the moon is polarized; the light of the sky is polarized by reflection from the atmosphere, the plane of polarization passing through the sun, the part of the sky examined and the eye. Polarization may also be caused by the light passing through certain crystals, as the Nicol prism, which we have just stated will confine the vibrations to one plane. In this case, the plane of polarization passes through the polarizing crystal and beyond, to the source of the light. In examining the corona with the polariscope, the observation consists in rotating the instrument and if polarization is found, noting the position of the plane of polarization. If the plane passes through the sun, the part of the corona examined and the eye, it indicates reflected

sunlight in the corona; if it passes beyond the sun but not through it, it shows that the polarization is caused by light passing through the corona, which must, then, contain substances capable of producing the phenomenon, unless polarization can be produced in other ways than those now known. Most of the polariscopic observations of the corona show reflected light.

Besides these that have been mentioned there are other minor subjects of study in an eclipse, such as the changes in temperature, the changes in the color of the sky and earth, the shadow as it sweeps over the earth with a velocity of half a mile each second, the effect of darkness upon living creatures—and we must not forget the search for new planets near the sun, which, as we shall see later, will render the eclipse of 1878 especially memorable.

The day of the eclipse was favorable at all the observing stations. To those in Colorado the clear weather was a glad surprise, for there had been no day for two weeks in which the eclipse could have been successfully observed. The preliminary observations and adjustments had in consequence been but partially made. The observers on the summit of Pike's Peak were obliged to abandon some of their plans, as there was not time to adjust the instruments. At our station, we worked in the early morning hours till daylight and to a late hour in the evening following the eclipse to complete the auxiliary observations. As the day advanced the final preparations were completed, and in the early afternoon, a few moments before the predicted time, the expectant observers took their appointed stations. No one would have imagined that a wonderful event was at hand. No trace of the moon could be seen. The face of Nature bore its accustomed aspect. But almost upon the expected moment, a little notch upon the sun's western limb



announced the approach of the moon. The eclipse had begun. Rapidly advancing, the moon seemed to hold the sun with iron grasp and to consume its light, the weaker victorious over the stronger. The effect upon the earth, scarcely perceptible till the sun was half hidden, from that time grew rapidly more apparent. Darkness seemed approaching, heralded not by the soothing twilight of the restful night but by a cheerless gloom. A sense of awe filled the soul. Men, with countenances changed to an ashen hue, spoke in whispers. The crescent of light became smaller and smaller, and soon the swift shadow was seen sweeping over the lofty mountains. The thin crescent faded away, and the dark moon was seen surrounded by a crown of unequalled glory, to whose beauty the stars bore silent witness. It lingered for awhile—and was gone. For a sudden burst of light marked the returning day. It seemed as if the Creator had once more spoken the words "Let there be light," for there *was* light. The rapid shadow sped away in its flight. The moon hastened to undo the work it had so recently wrought. The sun regained its power, the stronger victorious over the weaker. Nature once more assumed her wonted aspect. The eclipse was over.

[The remainder of the lecture was illustrated by a series of lantern views projected upon the screen by Mr. Leonard Waldo of Cambridge. First were given views of the recent eclipse as it appeared to the naked eye and as seen through telescopes by different observers.]

It is singular that the corona should appear so differently to different observers, even if they are at the same station and view it under similar conditions. But since this is an evident fact, it is natural to suppose that a more accurate representation of the corona may be obtained by photography. But there are several difficulties to be

encountered. One is in the proper time to expose the plate. When a photographer is taking a picture of a room he exposes his plate several minutes; if he is photographing a landscape scene in bright sunlight, a few seconds he finds to be sufficient. For the sun, the shortest exposure possible is required. The best photograph of the sun yet obtained was made with an exposure of  $\frac{1}{3000}$  of a second. In an eclipse, since the brightness is much greater close to the sun than farther away from it, a short exposure of a second or two will give the solar prominences but no corona, while a long exposure will represent more of the corona but the inner portions will be overexposed and therefore lose their details. This is illustrated by two views, one of the eclipse of 1860, in which the plate was exposed two seconds, and which shows the prominences only, and the other Dr. Draper's photograph of the last eclipse made with an exposure of 160 seconds. It was hoped by so long an exposure that the coronal streamers might be photographed, which has never yet been done. Indeed, from their absence on the photographs it has been argued that they are unreal. The picture does not show them, but it exhibits in the extreme portions traces of a radiated structure.

Another reason why reliance cannot be placed upon photographs alone is that all rays of light are not chemically active. It was shown very graphically by Prof. Osburn a few evenings ago that the actinic rays—those that are chemically active in developing the picture—are confined to the blue and violet and ultra-violet portions of the spectrum, the last named not being visible to the eye. Red and yellow rays affect the eye but not the sensitized plate. Hence a photograph does not give a perfect representation, since it may omit peculiarities which the eye discerns or add others invisible to the eye. (A

person sitting for a photograph shows unconscious knowledge of this fact, since he always expects the portrait to omit defects which belong of course to the red end of the spectrum and to bring out actinic beauties which no mortal eye can see.) It requires also much skill to photograph the corona. This was successfully accomplished for the first time in 1869, the photograph then obtained comparing well with the more recent ones. It is customary to obtain a series of photographs with different times of exposure, each of which will bear witness to a portion of the corona. [Illustrated by a photograph taken in Prof. Young's party, and by Mr. Whipple's photograph of the corona in the 1869 eclipse.]

It is interesting to compare the varied appearances of the corona in different eclipses. In the recent eclipse it was more elongated than usual, or at least the coronal streamers were on this occasion noticed to extend further from the sun than previously. The general outline was also quite irregular, though in this respect it was not unlike many others.

[A series of views was here shown representing the corona as seen in nine of the total eclipses that have been observed during this century.]

While the corona is still a very mysterious appearance, yet the result of observations made in past years has tended to establish the truth of certain theories with regard to it. It belongs to the sun, and not to the moon. It is not caused by our own atmosphere, as some have thought, considering it to be a mere optical illusion. It is undoubtedly true that its appearance is much modified by local influences, but from the summit of Pike's Peak, where the disturbing effects of the atmosphere were less than at other stations, it was seen in greater extent than elsewhere. Its presence surrounding the sun, when the

moon is absent, may be inferred from the fact that when either of the planets Venus or Mercury is about to cross the sun, it can be seen before touching the disk—a dark body on the coronal background. In eclipses also, a few minutes before or after the total phase, the whole outline of the moon can be seen. It is impossible to believe that the moon could have an atmosphere of sufficient size and density to cause the phenomena witnessed in the corona, and yet this atmosphere not be apparent in many other ways.

The examination of the corona by instrumental means strengthens the belief in its solar origin, at least in the solar origin of the portions nearest the sun. The observations with the polariscope in different eclipses have been quite conflicting. In some, no traces of polarization could be found, in others they were very marked, while the direction of the plane of polarization varied. A discussion made previous to the last eclipse by an English astronomer showed that the greater part of the observations might be harmonized on the supposition that the corona contained reflected sunlight, which might be caused by meteoric or other matter in the vicinity of the sun. The observations made last summer for the most part confirm this opinion. But there are certain observations in several of the eclipses which indicate that part of its light comes *through* certain substances and not by reflection, since the plane of polarization did not pass through the sun but tangent to it. This discordance in the polariscopic observations has not yet been explained.

Let us examine the testimony of the spectroscope.

[Upon the screen were shown the spectrum of the sun, the solar spectrum together with that of iron showing the coincidences of sixty-five of the bright lines in the spectrum of iron with dark lines in the solar spec-



trum, and the spectra of the sun, chromosphere, solar prominences and corona as seen in the eclipse of 1869.]

The spectrum of the chromosphere, the gaseous layer in which the solar prominences originate, contained the four hydrogen lines with several others not determined. In the spectrum of the prominences were found, besides these, four others, three of which were also found in the corona; of these two were rather faint, and have not generally been seen. The third, which is called the "1474" line, from its position on the standard scale, is considered the characteristic line of the coronal spectrum; it indicates the presence of an unknown gaseous substance which is also found in the sun, and probably thrown up from it into the corona. In the corona have also been seen the continuous spectrum, which would indicate incandescent solid or liquid matter, and the spectrum of sunlight with its dark lines, which would agree with the polariscope in indicating reflected sunlight.

Upon the testimony of the spectroscope, then, the corona is of a very complex nature, for it shines with its own light, shines with reflected sunlight, and contains an unknown gaseous substance found also in the sun. But the corona does not exhibit the same spectra in different eclipses. In the last eclipse the change was especially marked. The 1474 line was very faint—some observers failed entirely to see it—while the continuous spectrum was the marked feature, the dark solar lines being also seen. This noticeable change in the spectrum, particularly the unusual faintness of the 1474 line, points to a connection between the sun and the corona which is one of the most important results of the recent observations. The sun has been for some time past in a state of unusual quiescence; the spots and prominences are few, the chromosphere low. That at this time the corona should show

the least trace of the solar "1474 matter" it has ever exhibited since the spectroscope discovered its presence, is a proof that it, too, follows the periodicity characteristic of the sun. In a few years the sun spots will again become numerous, for their period is known; if the corona should then, as is confidently expected, exhibit the characteristics so marked in 1869 and 1870, when the sun was in great activity, the proof will be still more complete.

It is remarkable that while the 1878 corona contained less of the solar matter than formerly, it was more extended and exhibited more plainly the evidences of reflected light. The advocates of the view that it is mainly caused by reflection from meteoric substances in the vicinity of the sun find in this circumstance an argument for their theory; and some who before have believed that the inner corona was solar and the outer atmospheric in origin have changed to the meteoric theory. The sketch made by Prof. Abbe on the slope of Pike's Peak shows in a very striking way the extent of the corona as seen in high altitudes without telescopic aid. The observer has advanced the theory that the long bands of light are the grand meteor streams which the earth meets in August and November, the tapering of the bands being due to perspective. No other person, as far as known (for but few of the reports of the last eclipse have yet been published) has been so definite in designating the position of the meteoric bodies reflecting the coronal light, but the belief that this is the explanation of at least that portion of the corona farthest removed from the sun has been strengthened by the recent observations.

It has been customary for some observers to spend the time of totality in the search for new planets near the sun. To facilitate the work, a chart of stars is made

beforehand and the observer hunts systematically for objects not on the map. In the last eclipse several distinguished astronomers engaged in this work, two of whom report success for the first time in the history of eclipse observations. Each of them found two objects not on the chart, which therefore cannot be stars, for no stars except those on the chart exist in that part of the sky as bright as the new objects are described to be. The positions given by the two observers, Prof. Watson and Mr. Swift, unfortunately do not agree, and consequently there were four new objects seen, unless one of the observers in the hurry of the moment made a mistake in his record. This is a point which no one can settle. The new objects cannot be asteroids, for they are so bright that they would have been discovered long ago if that were the case. It has been suggested that they may be comets, but the discoverers are positive in their descriptions and would not be likely to be deceived, since they are experienced observers. It is generally conceded that one or more new planets moving about the sun within the orbit of Mercury has been discovered, and the search for new planets will receive much attention in future eclipses.

[The concluding illustration represented the progress of an eclipse, the sun being gradually concealed by the advancing moon, and the corona bursting forth at the moment of totality.]

We may sum up briefly the scientific results of the last eclipse, as far as they can now be given.

1. The discovery of one or more intra-Mercurial planets.<sup>1</sup>

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<sup>1</sup> Since the above was written, a valuable discussion of the subject of the existence of intra-Mercurial planets has been published by Dr. Peters of Hamilton College, New York. It presents in a masterly way the negative side of the question, showing that the supposed observations of such bodies that have been made dur-

2. The proof that the corona follows the same law of periodicity which affects the sun.

3. An advance in instrumental means of studying eclipses, shown by the invention of the tasimeter, and the successful photographing of the coronal spectrum.

4. The accumulation of more facts, which will have their value in combining the observations of different eclipses.

We may feel sure that future observations will throw more light upon the unsolved problems suggested by the phenomena of an eclipse. The sole object of these observations is to add to our knowledge of this wonderful universe,—a universe which in its grandest or in its humblest appearances speaks its Creator's praise.

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ing this century are unreliable, while the great mass of testimony is opposed to their existence. The objects seen by Prof. Watson in the last eclipse are explained to be certain known stars which would coincide with the observed positions if we admit an error in the observations—an error which is claimed to be within the limits of accuracy possible under the conditions of observation. This criticism, which is sustained by good arguments, coupled with the mass of negative evidence, places the subject once more in a doubtful position. But it is certain that the interest excited by the supposed discoveries will make the search for new planets a prominent part of future eclipse observations.



*Notes on the Native and extensively introduced Woody  
Plants of Essex County, Massachusetts.*<sup>1</sup>

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BY JOHN ROBINSON.

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PREFACE.

THE following notes on the woody plants of Essex County have been collected for the purpose of giving what is known of the trees and shrubs which are natives of the soil, and those which have been extensively introduced. It is not possible to bring together here all the information which might be collected, but it is certain that sufficient will be found to show thoroughly the nature of the species, their hardiness, and the size they attain within our county's limits. The principal facts are taken from the extensive notes made by Mr. John H. Sears of Danvers, and the observations made since by Mr. Sears and the present writer while botanizing in various parts of the county. Besides, the work of the older botanists has been examined, and references will be found to Dr. Chas. Pickering, William Oakes, Rev. J. L. Russell, S. P. Fowler, and others. The writer desires to express his thanks to the many persons who, more or less interested in the subject, in various parts of the county, have so uniformly shown their kindness by adding much valuable information, which has been incorporated in the notes. Almost every species referred to in these pages is represented in the Essex County Botanical Collection in the Museum of the Peabody Academy of Science, at Salem, where besides the dried specimens of leaves, flowers, and fruit of the plants, there is also a very complete collection of the wood arranged to show its transverse and vertical section, and the bark of each species. This collection is the result of a systematic attempt to illustrate the woody plants of Essex County, and was gathered chiefly by Mr. Sears. Should it chance that any one reading these pages can add any information to that already collected, the writer would esteem it a great favor that it should be communicated to him.

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<sup>1</sup>Names of species in this type: *Tilia Americana*, L., indicate plants which are natives of Essex County; in this type: *Magnolia acuminata*, L., plants which are natives of North America, usually within the scope of Gray's Botany, (i.e., east of the Mississippi and north of Virginia), and introduced into Essex County; in this type: *Berberis vulgaris* L., plants which are from foreign countries, usually natives of Europe, introduced into Essex County.

## RANUNCULACEÆ.

(CROWFOOT Family.)

**Clematis Virginiana, L.** (COMMON VIRGIN'S BOWER.) A very pretty climber, seldom forming stems of much size. It is quite abundant near Salem, and is frequently met with in cultivation, where it makes with its flowers in August, and later with its feathery fruit, a very attractive trellis plant. Many other species of this beautiful genus are found in our gardens. The *C. [Atragane] verticillaris*, D. C., which grows near Mt. Wachuset, is probably not a native of this county.

## MAGNOLIACEÆ.

(MAGNOLIA Family.)

**Magnolia glauca, L.** (SMALL MAGNOLIA. SWEET BAY.) This beautiful plant, so far north of its central habitat, has given the name to the summer resort near which the magnolia swamp is situated in Gloucester, and the original locality is so widely known that the plants are fast being removed (often very carelessly) for cultivation. The young buds are so quickly taken off by the venders of the flowers that it is almost impossible to find a perfect specimen. Fortunately, however, there are one or two other swamps in which the *M. glauca* grows, not so easy of access, extending towards the town of Essex, where this rare plant is likely to remain undisturbed for a while longer. It is not known by whom it was first detected here, but it probably has been familiar to the residents of the vicinity for a century.<sup>2</sup>

**Magnolia acuminata, L.** (CUCUMBER TREE.) Frequent in cultivation, easily enduring the winters except in very exposed places. One tree of this species upon the estate of Gen. Loring in Beverly almost rivals more southern specimens by its fine growth.

*M. macrophylla*, *M. umbrellæ*, and *M. CONSPICUA* (Yulan of the Chinese), are occasionally met with in cultivation, requiring some protection during winter when planted in exposed places.

**Liriodendron tulipifera, L.** (TULIP TREE.) A native of southern New England and westward. A tree commonly cultivated, but

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<sup>2</sup> Dr. Henry Wheatland kindly furnishes the following note:—

"Rev. Manasseh Cutler, LL.D., of Hamilton, was the person who first brought to public notice the magnolia locality in Gloucester and Manchester; or at least tradition says so. In a notice of a field meeting of the Institute at Manchester in 1856, Rev. J. L. Russell says, 'It was a source of no ordinary pleasure to be able to stand on the most northern limit of this fine and ornamental tree, probably near the very spot where its fragrant blossoms attracted the notice of the Rev. Dr. Manasseh Cutler many years since.' Proc. E. I., Vol. II, p. 34."

here never reaching the magnificent proportions to which it grows in the west. It is a clean and handsome shade tree.

## BERBERIDACEÆ.

(BARBERRY Family.)

*BERBERIS VULGARIS*, L. (COMMON BARBERRY.) Few persons familiar with the barberry know that it has been introduced from Europe, yet such is the case, and aside from the eastern portion of the New England states it is a comparatively rare shrub. The fruit is much used when preserved as a dinner sauce, and the plants if properly pruned form a very beautiful hedge.

Dr. William Mack, of Salem, who has given much attention to the introduction of shrubs and trees in this vicinity, and who has experimented to a considerable extent with our American species, considers the barberry to be one of the best of hedge plants. He has found those raised from seeds to succeed the best; they should when two years old be planted out in a double row, the plants being one foot apart, those of one row coming opposite the spaces of the other. After a few year's growth the pruning should be commenced. The hedge thus treated by Dr. Mack became in ten years a solid mass six feet high and three or four feet wide. When growing in hedges the barberry seldom produces fruit.

## CISTACEÆ.

(ROCK-ROSE Family.)

*Helianthemum Canadense*, Michx. (FROST-WEED.) A little plant flowering in August and September, resembling somewhat the small Evening Primrose.

*Hudsonia tomentosa*, Nutt. (HUDSONIA.) A curious little plant growing in sandy places, resembling in appearance a Heath. Abundant at Ipswich, Plum Island, and Nahant.

*Lechea tenuifolia*, L. *thymifolia*, Pursh., *L. major*, Michx., and *L. minor*, Lam., are homely weeds growing in sand or poor soil. The plants of this family have somewhat woody stems.

## MALVACEÆ.

(MALLOW Family.)

*Althæa officinalis*, L., is found on salt marshes, and is reported at Salisbury by Mrs. Downs.

*Hibiscus moscheutos*, L., was found at Swampscott fifty years ago by the late Dr. Chas. Pickering, the place where it then grew is now occupied by summer boarding-houses.

*HIBISCUS SYRIACUS*, L. (COMMON ALTHÆA.) Always cultivated. It is sometimes found to spread by seeds almost as though it were wild.

### TILIACEÆ.

(LINDEN Family.)

*Tilia Americana*, L. (AMERICAN LINDEN. BASSWOOD.) A fine shade tree scattered through the county, seldom more than a few trees being seen together. It is subject to the attacks of insects, the leaves by mid-summer often being quite unsightly, owing to their almost skeletonized appearance. Mr. J. H. Sears, of Danvers, to whom the writer will frequently have occasion to refer in these notes, gives the following measurements of a Basswood which, in 1867, grew in Danvers, beside a never-failing spring.

Circumference 12 feet 3 inches at 1 foot from ground  
 " 10 " 6 " " 5 feet " "  
 Height 50 feet.

Another before the farm house of Mr. Nathaniel Boardman was in 1875,

Circumference 12 feet 10 inches at 1 foot from ground.  
 " 9 " 0 " " 5 feet " "  
 Height 45 feet.

The wood is chiefly used in carriage and cabinet work.

*TILIA EUROPÆA*. (EUROPEAN LINDEN.) Much used as a street shade tree, represented in the county by some very fine specimens. The leaves are smaller than those of the American Linden, and the time of flowering somewhat earlier.

Six European Lindens in Beverly, in 1876, measured as follows, commencing with one opposite the southeast corner of number 82 Cabot St.

No. 1.	Circumference	9 feet 8 inches at 1 foot from ground.
"	"	9 " 9 " " 6 feet " "
No. 2.	"	9 " 8 " " 1 foot " "
"	"	8 " 11 " " 6 feet " "
No. 3.	"	9 " 1 " " 1 foot " "
"	"	8 " 6 " " 6 feet " "
No. 4.	"	10 " 6½ " " 1 foot " "
"	"	9 " 0 " " 6 feet " "
No. 5.	"	11 " 6½ " " 1 foot " "
"	"	9 " 5 " " 6 feet " "
No. 6.	"	10 " 9½ " " 1 foot " "
"	"	8 " 8 " " 6 feet " "

Height about 70 feet.

### RUTACEÆ.

(RUE Family.)

*Zanthoxylum Americanum*, Mill. (NORTHERN PRICKLY ASH. TOOTH-



ACHE TREE.) This plant, although a northern shrub, does not, it is probable, grow naturally within the county limits. There are in Boxford, Danvers, and Georgetown several localities for Prickly Ash. Mrs. W. S. Horner kindly furnishes the following information: "The Prickly Ash was brought from Topsfield in 1835 and planted in several places in this vicinity, by Mr. Andrew Horner, who held its medicinal properties in much esteem. The plant is growing in several places here as a shrub from six to twelve feet high, perhaps under better conditions it might grow larger." It would be interesting to know when and by whom it was introduced into Topsfield.

**AILANTHUS GLANDULOSUS.** (TREE OF HEAVEN. CHINESE SUMACH.) A native of China, introduced into this country in 1784, at Philadelphia. This very handsome tree was extensively planted as a shade tree in our cities, but the offensive odor of the staminate flowers made it unpopular, and it was found that the pollen and fallen flowers injured the water collected from the roofs of houses near which the trees were planted.

This tree is well adapted for planting in sandy soil, as for instance that of Plum Island. The Russian government use it on the steppes, where it has been remarkably successful. The wood is handsome, excellent for furniture, somewhat resembling oak. This tree is very easy of propagation, for, besides being raised from seeds, every bit of root when cut in pieces will form a bud. For a shade tree this suckering is objectionable. A very full account of the *Ailanthus* will be found in the Twenty-fifth Annual Report of the Secretary of the Board of Agriculture of Mass., by Prof. C. S. Sargent, from which this brief account is taken.

## ANACARDIACEÆ.

(CASHEW Family.)

**Rhus typhina, L.** (STAGHORN SUMACH.) Quite common in various parts of the county. A tree in the garden of Mr. Joel Kimball in Beverly, measured in 1878, 25 feet in height, with a diameter of 10 inches.

**Rhus glabra, L.** (SMOOTH SUMACH.) Abundant, particularly in Wenham, Ipswich, and Hamilton.

**Rhus copallina, L.** (DWARF SUMACH.) In similar localities to the last.

**Rhus venenata, D C.** (POISON SUMACH.) Poison Dogwood is an unfortunate name to give to this plant, although it is the one by which it is most generally known. The Dogwoods all have large panicles of white flowers and are harmless to handle, while the poison Sumach has inconspicuous flowers.

The Poison Sumach grows to considerable size in the county; one tree in Hamilton has a head some 15 feet in diameter, with a trunk branching near the ground into several divisions.

**Rhus Toxicodendron, L.** (POISON IVY.) This very common poisonous plant will be found at one time in the form of a very delicate vine, and at another a stout, coarse-leaved shrub supporting itself against a wall or tree. One form has been called *R. radicans*, but the intermediate forms so connect it with the first that it has been considered only a variety of strong growth. These two last species of *Rhus* are the only plants poisonous to the touch growing in the county. Neither have attractive flowers or fruit. It is only the showy leaves of *R. venenata* in autumn that would ever lead a person to handle the plant through any attraction of its own. Considering the abundance of these species, and the frequency with which they must be touched, even roughly handled by many persons, particularly by children, it is a wonder that their poisonous effects are not more often seen.

If any one suspects that either of these plants have come in contact with the person, let the part so touched be washed with a strong, coarse soap. If the eruption makes its appearance, apply water, as hot as can be borne, to the affected part; this will benumb the little nerves which are irritated and dull the pain. If a disagreeable swelling is caused by being poisoned, seek the advice of the best neighboring regular physician. Some persons may handle these plants with impunity, others are so sensitive that their near presence to the plant without contact with their person is sufficient to cause a swelling of the face. Many other plants are charged with being the cause of poisonings. It is probable that all such charges are erroneous, and that unconsciously one of the two poisonous sumachs have been handled or brushed against. In collecting other plants the wide-spreading roots of one of them may have been met with. This has proved to be the explanation of several cases of mysterious plant poisoning.

**RHUS COTINUS** (SMOKE TREE.) is very common in cultivation.

## VITACEÆ.

(VINE Family.)

**Vitis Labrusca, L.** (NORTHERN FOX GRAPE.) Very common. Fruit ripening during the latter part of August or first of September. A white fruited variety with paler green leaves has been found in Danvers by Mr. Sears. This species, "Improved by cultivation has given rise to the Isabella, Catawba, Concord, and other varieties." Gray.

*Vitis æstivalis*, Michx. (SUMMER GRAPE.) Not so common as last. Found on Cape Ann, as is also

*Vitis cordifolia*, Michx. (WINTER OR FROST GRAPE), which has been found in Essex.

*Ampelopsis quinquefolia*, Michx. (VIRGINIAN CREEPER.) This beautiful climber in our northern latitude takes the place of the English Ivy (*Hedera helix*) as a wall plant. It is very abundant wild, and much in use in cultivation.

The beautiful, closely clinging *AMPELOPSIS VETCHII* is now being introduced as a wall climber with great success near Boston, where it proves perfectly hardy.

### RHAMNACEÆ.

(BUCKTHORN Family.)

*RHAMNUS CATHARTICUS*, L. (COMMON BUCKTHORN.) This has always been extensively used for hedges, and where plants have been allowed to grow up singly, the seeds produced are widely distributed, and small plants are abundant.

*Ceanothus Americanus*, L. (NEW JERSEY TEA.) A low shrub with very pretty white flowers in July. Common in Beverly, Georgetown, etc. "The leaves were used for tea during the American Revolution, and the manufacture has been recently revived in Pennsylvania." Gray.

### CELASTRACEÆ.

(STAFF TREE Family.)

*Celastrus scandens*, L. (ROXBURY WAXWORK. CLIMBING BITTER-SWEET.) Common in Salem, Beverly, Middleton, etc. This species is an excellent one for arches or trellis work when a plant that will bear pruning is desired. The scarlet fruit remains in the open pod after the leaves have fallen, often through the entire winter.

*Euonymus atropurpureus* Jacq. (BURNING BUSH. SPINDLE TREE.) A native of New York state. Often cultivated here.

### SAPINDACEÆ.

(SOAPBERRY Family.)

*ÆSCULUS HIPPOCASTANUM*, L. (HORSE-CHESTNUT.) This valuable and extensively planted shade tree was introduced from Europe during the last century. "It is a native of Asia, and was carried to France in 1615 from Constantinople. The fruit is in Germany boiled and used to fatten cattle and fowls. The name horse-chestnut is derived from the fact that in Turkey and Germany it is employed in veterinary

medicine." *Emerson*. A tree in the writer's garden, fifty years old, measured, Sept., 1878,

Circumference 8 feet 1 inch, 1 foot from ground.

" 6 " 10 inches, 6 feet " "

Height about 60 feet.

The Red Horse-chestnut and perhaps one or two others are met with in cultivation.

***Acer Pennsylvanicum*, L. (STRIPED MAPLE.)** In some towns this shrub or tree is called Moose-wood, a name applied to *Dirca palustris* and also to *Viburnum lantanoides* in other places. This is a good illustration of the danger of using the common names of plants when accuracy is desired, and the importance of a botanical name which is accepted everywhere for a species. The Striped Maple is often met with in Essex Woods, Rockport, Swampscott, Andover, Georgetown, etc. The trunk occasionally reaches a diameter of six inches, in specimens planted out, one of which may be seen in Harmony Grove Cemetery in Salem, another on the grounds of G. A. Tapley, Esq., Danvers. The leaves sometimes are found to measure 8 by 10 inches.

***Acer spicatum*, Lam. (MOUNTAIN MAPLE.)** Although at the White Mountains, and elsewhere, this species is found in company with the Striped Maple, yet it has not been authentically reported within our county limits. It is rarely seen even in cultivation, under which treatment it makes a very pretty shrub.

***Acer saccharinum*, Wang. (SUGAR MAPLE. ROCK MAPLE.)** Nearly all of the old and large specimens of this tree have been destroyed, so that the native growth is chiefly suckers from the old stumps. Trees of this species are occasionally seen with a trunk eighteen inches in diameter. Planted out, the Sugar Maple is a most beautiful shade tree, although rather dense for city streets. Little or no sugar is made from the maple in this county, both on account of the scarcity of large trees and the unfavorable conditions of the climate.

The variety *nigrum* (*A. nigrum*, *Mich.*) is seen now and then in cultivation where it becomes a fine tree.

***Acer dasycarpum*, Ehrhart. (WHITE MAPLE. SILVER MAPLE.)** This tree, common in cultivation, grows naturally along the Ipswich River and elsewhere in the northwestern part of the county, where many fine specimens are found. One tree in Topsfield measured by Mr. Sears and the writer, May, 1875, was eight feet in circumference four feet from the ground. Many others of similar size are to be met with.

***Acer rubrum*, L. (RED MAPLE. SWAMP MAPLE.)** This species



is very abundant in nearly all parts of the county. The leaves vary greatly in size and shape, and the fruit varies in size, position of the keys as regards each other, and their color. In Gray's Manual this maple is spoken of as "a small tree," which is evidently an accidental mistake, as it often grows to great size. Two trees growing in "Blind-Hole Swamp," Danvers, in 1865, measured by Mr. Sears, were,

- |     |               |  |
|-----|---------------|--|
| (1) | Circumference | 8 feet 6 inches at 1 foot from ground. |
|     | "             | 7 " 5 " " 6 feet " "                   |
|     |               | 90 " high, 24 feet to first limb.      |
| (2) | "             | 8 " 0 inches at 2½ feet from ground.   |
|     | "             | 7 " 5 " " 6 " " "                      |
- Height 50 ft., spread of branches 50 ft. in diameter.

In Ipswich, near the homestead of Mrs. Warner, on the bank of the river, is a remarkably fine old Red Maple, which measured, in 1875, as follows:—

Circumference	13 feet 9 inches at 1 foot from ground.
"	14 " 2 " " 5 feet " "

Just above, the trunk divides into sixteen limbs; the height is about 55 feet, and the spreading branches make their greatest diameter 74 feet.

Mrs. Horner sends the measurements of a Red Maple lately felled near Gage's ferry, Bradford, 1876.

Circumference 26 feet at 4 feet from the ground, one branch circumference 12½ feet. Mrs. Horner states that there are several other large Red Maples left in this region.

**ACER PSEUDO-PLATANUS** (SYCAMORE MAPLE), **ACER PLATANOIDES** (AUSTRIAN MAPLE.) European trees which are frequent in cultivation, where they often rival the native species in the strength and rapidity of their growth.

*Negundo aceroides*, Moench. (ASH-LEAVED MAPLE. BOX-ELDER.) This is the *Acer negundo*, L., a northern plant extending into Pennsylvania. It is cultivated in this vicinity, and it has occasionally been found escaped. A variegated leaved form is also found in cultivation.

## LEGUMINOSÆ.

(PULSE Family.)

**GENISTA TINCTORIA**, L. (WOAD-WAXEN, DYER'S WEED.) Introduced early from Europe, this plant has become most thoroughly established in the county. The masses of its gorgeous yellow flowers in July, make the otherwise barren hills in the vicinity of Salem a magnificent sight. At one point in the Salem Great Pastures scarcely anything but this plant can be seen for miles around. A near relative of this plant, *Cytisus scoparius* (Scotch Broom), runs wild in Virginia.

*Robinia pseudacacia*, L. (COMMON LOCUST.) The Locust is a native of Pennsylvania and westward. It has so long been cultivated in this vicinity that it has in many places the appearance of being a native of the county.

Owing to the attacks of borers, the Locust trees planted singly along walls or scattered through a field are liable to be broken by high winds, and consequently the tree is less frequently met with than formerly. According to Emerson the pests which attack the various species of *Robinia* are less troublesome among trees planted in groves. Hon. Benj. Perley Poore, at Newbury, has succeeded with the Locust cultivated in this manner admirably, and it is to be regretted that the planting of so valuable a tree should be discontinued.

Mr. Sears states that the fallen leaves are considered as more of an improvement to the land than those of any other tree, a fact corroborated by Mr. Poore's experience. Mr. Sears gives the measurements of several Locusts as follows. One on the Gardner farm near Salem being 12 feet in circumference. Three trees on the Pedrick estate, Danvers, measured respectively, 6, 7, and 8 feet in circumference, and were from 50 to 80 feet high.

*Robinia viscosa*, Vent. (CLAMMY LOCUST.) A smaller tree than the last, with the inodorous flowers in shorter and more compact clusters. A native of Virginia, and it is frequent in cultivation, spreading extensively by suckers.

*Robinia hispida*, L. (ROSE ACACIA.) Also from Virginia. It is occasionally found as a garden plant, where it is a small shrub.

*Wistaria frutescens*, D C., from West Virginia, etc., is occasionally cultivated.

SOPHORA JAPONICA, of Japan, is hardy in the county, and is now and then cultivated.

*Cladrastis tinctoria*, Raf. (YELLOW WOOD), the *Virgilia lutea*, Michx. f., from Kentucky, is also hardy, but requires a sheltered place.

*Cercis Canadensis*, L. (RED-BUD), of New York State, is a quite hardy and handsome shrub or tree in cultivation.

*Gleditsia triacanthos*, L. (THREE-THORNED ACACIA. HONEY-LOCUST.) This tree, very common in the vicinity of Salem, is a handsome, rapidly growing shade tree, yet, if persistently pruned when small, it will form an admirable hedge. Trees of this species are not uncommon from 18 inches to 2 feet in diameter, and from 50 to 60 feet high. This species is a native of Pennsylvania.

## ROSACEÆ.

(ROSE Family.)

*Prunus Americana*, Marshall. (WILD YELLOW, OR RED PLUM.) Specimens of the flowers of this tree, collected by William Oakes in

the county, are in the herbarium of the Peabody Academy of Science. It is a small, thorny tree.

***Prunus maritima*, Wang.** (BEACH PLUM.) This shrub is very abundant at Plum Island, and also along the stone walls at the roadside for some distance into the interior of the county. It is said that the farmers going to the island for "thatch" (*Spartina stricta*), collect plums and eating them on their way home, throw the stones by the wall, thus establishing the species in the interior towns.

***Prunus spinosa*, L.** (SLOE. BLACK THORN.) Reported as introduced in one or two instances.

***Prunus pumila*, L.** (DWARF CHERRY.) Reported from Andover, by Mrs. A. S. Downs and Rev. H. P. Nichols. It was also collected at Lynn, by Dr. Chas. Pickering, about 1823.

***Prunus Pennsylvanica*, L.** (WILD RED CHERRY.) This is a very small tree, quite common in the county.

***Prunus Virginiana*, L.** (CHOKER CHERRY.) A tall shrub, very common in all parts.

***Prunus serotina*, Ehrhart.** (WILD BLACK CHERRY.) The late Dr. Chas. Pickering did not consider this tree to be a native of Essex County, but that it was introduced at an early date by the colonists. The Black Cherry is now very abundant along walls, in fields, and by streams. The trees of this species attain considerable size; one in Boxford measured by Mr. Sears, in 1875, was,

Circumference 10 feet at 2½ feet from ground.

" " 8 " " " "

Height about 60 feet.

Another, measured in 1879, was 8 feet in circumference 4 feet from the ground. The wood of this tree is very valuable, and it is unfortunate that the tree should meet with so much abuse on account of its being the favorite of the caterpillars.

**P. (AMYGDALUS) NANA** (FLOWERING ALMOND), **P. (A.) PERSICA** (PEACH), **P. ARMENIACA** (APRICOT), and **P. DOMESTICA** (GARDEN CHERRY), are all common in cultivation, mostly having been introduced at an early date.

***Spiræa opulifolia*, L.** (NINE-BARK.) Probably not a native of the county, although common in cultivation. Mr. C. E. Faxon has found this species undoubtedly indigenous at Blue Hill, Milton, Mass.

***Spiræa salicifolia*, L.** (MEADOW SWEET), forms quite a stem at times, as does

***Spiræa tomentosa*, L.** (HARDHACK.) Both are very common. Other foreign shrubby species are met with in cultivation.

***Potentilla fruticosa*, L.** (SHRUBBY CINQUE-FOIL.) In Ipswich this remarkable *Potentilla* is quite common, and it is found in a few

other places Rockport, *Mr. Frank Lufkin*; Georgetown, *Mrs. Horner*. The stems are sometimes half an inch in diameter, the plants often being three or four feet high.

***Rubus odoratus*, L.** (PURPLE FLOWERING RASPBERRY.) Many persons suppose that because this plant is so common in old gardens that it is not a native shrub, yet it was known to Higginson, who mentions it as growing near Salem, in a locality without doubt still in existence. This species is not uncommon in various parts of the county.

***Rubus triflorus*, Richardson.** (DWARF RASPBERRY.) Danvers, probably in other localities. It is a vine of little consequence, without prickles. The stems are of annual growth.

***Rubus strigosus*, Michx.** (WILD RED RASPBERRY.) Very common. The fruit much marketed.

***Rubus occidentalis*, L.** (THIMBLEBERRY.) Not so common as last, the fruit less esteemed.

***Rubus villosus*, Ait.** (HIGH BLACKBERRY.) Very abundant, the fruit much in demand. This species varies much. A small form with berries of a poorer quality is found in Danvers, and other forms almost connect it, as Gray states, with

***Rubus Canadensis*, L.** (LOW BLACKBERRY, DEWBERRY), which is quite common in all parts, with a delicious berry preferable to that of *R. villosus*.

***Rubus hispidus*, L.** (RUNNING SWAMP-BLACKBERRY.) Although this does not always grow in swamps, yet it is sometimes found there. The fruit is of no value, and the vines are very troublesome to pedestrians.

***Rosa Carolina*, L.** (SWAMP ROSE.) Very common in Beverly, Gloucester, etc.

***Rosa lucida*, Ehrhart.** (COMMON WILD ROSE.) This varies much in the color of the flowers. Very common in all parts.

***Rosa rubiginosa*, L.** (SWEET BRIER.) Escaped from old gardens and become thoroughly naturalized. It is difficult to distinguish this species from

***Rosa micrantha*, Smith.** (SMALL SWEET BRIER), which is now and then found.

***Rosa cinnamomea* (CINNAMON ROSE).** Common in old gardens, and sometimes found escaped. Many foreign roses are of course hardy in gardens. Those of the Hybrid-perpetual varieties require protection during winter.

***Crægus oxyantha*, L.** (ENGLISH HAWTHORNE.) Some fine trees of this species, according to Tracy, are found in Saugus, where they have made themselves quite at home. This tree is often met with in cultivation.



**Crataegus coccinea, L.** (SCARLET-FRUITED THORN.) Quite common in Ipswich, Topsfield, etc. Mr. Sears mentions one in Danvers, with a trunk 17 inches in circumference and 18 feet high.

**Crataegus tomentosa, L.** (BLACK OR PEAR THORN.) In similar localities to last. It varies much.

**PYRUS MALUS, L.** (APPLE.) Introduced very early from Europe. Oftentimes the apple is found in the woods and fields, long distances from farms, where seedlings have chanced to spring up. The fruit of these sometimes is of a very pleasant flavor. Old trees are often seen 7 to 10 feet in circumference.

**PYRUS COMMUNIS, L.** (PEAR.) Among the earliest fruits introduced by the colonists was the Pear. Mr. Robert Manning in an article entitled "Notes on Ancient Pear Trees," in the Proceedings of the American Pomological Society, 1875, states, that the celebrated "Endicott Pear Tree" was thought to have been planted in 1630, having been brought from England in the Arabella, or some other vessel, in June of that year. Gov. Endicott's farm was granted in 1632, so that the trees imported may have been first placed in the Governor's Salem garden. The "Endicott Pear Tree" is now not much more than sucker growth from the original tree.

The Orange Pear Tree in the garden of Capt. Chas. H. Allen, on Hardy St., Salem, is in much better condition. It is supposed to have been planted about 1640. In 1875 it was 9 feet 5 inches in circumference at the smallest part between the roots and the branches, and in 1862 bore thirteen and a half bushels of pears. Other old pear trees are to be found, but not so venerable as these.

**Pyrus arbutifolia, L.** (CHOKE-BERRY.) Common throughout the county.

**Pyrus Americana, DC.** (AMERICAN MOUNTAIN-ASH.) It is probable that this species was once to be found indigenous in the county, where it is now seen in cultivation with the

**PYRUS AUCUPARIA, Gaetn.** (EUROPEAN MOUNTAIN ASH.) The fruit of these trees being eagerly sought by birds, the seeds are widely distributed, and the young trees are found almost anywhere. The European Mountain-Ash seldom forms a handsome tree, the foliage is sparse, and the smaller limbs are easily broken by the weight of the heavy fruit. It is very common in cultivation.

**Amelanchier Canadensis, Torr. & Gray.** (SHAD-BLOSSOM. JUNE-BERRY.) This very interesting shrub is quite common in moist land in all parts of the county.

**Var. Botryapium (PYRUS BOTRYAPIUM, WILLD.),** is the larger growing form, with smooth leaves and longer petals. A tree of this variety in Danvers, Mr. Sears measured in 1875, was 8 feet in circumference below the seven branches into which the trunk soon

divided. Three of these branches were 18 inches in circumference, the tree was 28 feet high. In May, the whole is a magnificent mass of white flowers.

Var. *oblongifolia* is smaller, with shorter petals, and leaves downy beneath.

The fruit of the Amelanchier is ripe the last of June or early in July. It is sweet and excellent, and if it were not that birds appreciate this fact as well as man, it might be a valuable market berry. It is now often seen on sale among the blueberries in the first of the season.

The wood of this tree has a speckled appearance, and is very pretty. Darlington says that the fruit may be improved by long cultivation, and Emerson considers it an experiment well worth trying, to ascertain how far it might be improved.

CYDONIA VULGARIS (COMMON QUINCE), and CYDONIA JAPONICA (JAPAN QUINCE, PYRUS JAPONICA), are extensively cultivated, the latter for ornament, the former for the fruit.

## CALYCANTHACEÆ.

(CALYCANTHUS Family.)

*Calycanthus floridus*, L. (CAROLINA ALLSPICE.) A native of Virginia southward, with very fragrant, strawberry-scented flowers. It is often cultivated.

## SAXIFRAGACEÆ.

(SAXIFRAGE Family.)

*Ribes hirtellum*, Michx. (WILD GOOSEBERRY.) Quite common.

*Ribes floridum*, L. (WILD BLACK CURRANT.) Not so common as the last. (Ipswich, Oakes in herb. P. A. S.)

RIBES RUBRUM, L. (RED CURRANT.) Cultivated everywhere. Although our American plant is "seemingly not distinct from the garden Red Currant of Europe" Gray. It is probable that all the specimens found growing wild in this region have originated from garden plants, as the localities for the truly native specimens are much farther north.

RIBES GROSSULARIA (GARDEN GOOSEBERRY.) Much cultivated, as is the

RIBES NIGRUM (GARDEN BLACK CURRANT.) It is probable that these European species have been transported by birds or other agencies to distant localities, as they are often found escaped.

*Ribes aureum*, Pursh. (MISSOURI CURRANT.) Much cultivated for its early spicy, fragrant yellow flowers.

*Philadelphus grandiflorus* (LARGE-FLOWERED MOCK-ORANGE), from Virginia, and

*PHILADELPHUS CORONARIUS* (COMMON MOCK-ORANGE), from Japan, are frequent in old gardens. They are improperly called "Syringa," the botanical name for the Lilac.

## HAMAMELACEÆ.

(WITCH-HAZEL Family.)

*Hamamelis Virginica*, L. (WITCH-HAZEL.) Very common in most parts of the county, often growing 25 feet high, with a trunk 4-6 inches in diameter.

## LYTHRACEÆ.

(LOOSESTRIFE Family.)

*Nesæa verticillata*, H. B. K. (SWAMP LOOSESTRIFE.) Common along the borders of streams and ponds. It sometimes has a stem the size of the fore finger, and is interesting botanically on account of the spongy bark which is found on all the stems which dip into the water, a feature possessed in common with other plants inhabiting similar situations.

## CACTACEÆ.

(CACTUS Family.)

*Opuntia vulgaris*, Mill. (PRICKLY PEAR.) This plant grows naturally from Nantucket southward. Mr. Hugh Wilson found plants of it at Kernwood, Salem (probably escaped), some years ago, and on the land of Mr. Graves in North Reading, on a sandy bank of the Ipswich River, just beyond the Middleton line, is a fine patch of this plant which has increased rapidly from plants placed there many years since.

## CORNACEÆ.

(DOGWOOD Family.)

*Cornus florida*, L. (FLOWERING DOGWOOD.) This is in the flowering season a very beautiful and conspicuous tree. It grows from 10-20 feet high, with a trunk some 3-5 inches in diameter. It is found abundant in parts of Wenham Swamp, where it was noticed by Dr. Chas. Pickering in 1824, and also in Essex, Boxford, etc. These are about the most northerly localities for this species.

*Cornus circinata*, L'Her. (ROUND-LEAVED CORNEL.) "Lynn, Saugus, Swampscott," Tracy. "Andover," Mrs. Downs, Rev. H. P. Nichols. Boxford, Beverly, etc. A low tree, or tall shrub.

**Cornus sericea, L.** (SILKY CORNEL.) "Wenham Swamp, 1824," Dr. Charles Pickering. Georgetown, etc. A shrub.

**Cornus stolonifera, Michx.** (RED-OSIER DOGWOOD.) Georgetown, Mrs. Horner, and various other parts of the county. A tall shrub.

**Cornus paniculata, L'Her.** Byfield and Danvers, J. H. Sears, Wenham, etc. A tall shrub.

**Cornus alternifolia, L.** This is the most tree like of our native species, often of quite striking form, growing 20 feet high, with a trunk 6 inches in diameter. These are the true Dogwoods, having handsome, cymose flowers, and must not be confounded with the wrongly called "Poison Dogwood," which is not a Dogwood at all, but a Sumach, with unattractive green flowers. The little "Bunchberry" (*Cornus Canadensis*) is also very abundant in our woods.

**Nyssa multiflora, Wang.** (TUPELO.) An irregular tree, with a beautiful shining green foliage, turning a deep red in autumn. Common in various parts of the county, and often growing 50-60 feet high. One curious tree in Danvers, measured by Mr. Sears, was 6 feet in circumference near the ground, dividing at about 13 feet above into three branches, two of which grew erect to the height of some 70 feet, the third pushing out at a right angle, the end nearly touching the ground.

## CAPRIFOLIACEÆ.

(HONEYSUCKLE Family.)

*Symphoricarpus racemosus, Michx.* (SNOWBERRY.) A native of Vermont and Pennsylvania. Common in cultivation, and often escaping from old gardens.

**Lonicera sempervirens, Ait.** Ipswich, Mrs. M. W. Kimball, Topsfield, J. H. Sears, Salem Great Pastures, G. D. Phippen, Marblehead, Rev. J. L. Russell. This seems to be a native plant.

*Lonicera grata, Ait.*, from New York state, is also cultivated.

**Lonicera ciliata, Muhl.** A pretty little shrub, flowering in May. Not rare in our woods.

**Diervilla trifida, Mœnch.** A low bush of somewhat variable habit. Common along roadsides.

**Sambucus Canadensis, L.** (COMMON ELDER.) Very abundant in most towns, often reaching considerable size.

**Sambucus pubens, Michx.** (RED-BERRIED ELDER.) This also grows quite large. It is found at Essex, Rockport, Andover, "Salem, 1840," J. L. Russell. Rather scarce here, it being a more northern plant.

**Triosteum perfoliatum, and Linnæa borealis,** but hardly coming under the head "shrubby," are both found in the county.



**Viburnum Lentago**, (SHEEP-BERRY.) Found in most parts of the county.

**Viburnum nudum**, *L.* Essex, Danvers, etc.

**Viburnum dentatum**, *L.* Wenham, Beverly, Essex, Georgetown, etc. Common.

**Viburnum acerifolium**, *L.* Smaller than the preceding, and less common. In the older woods.

**Viburnum Opulus**, *L.* (CRANBERRY TREE.) This shrub, although very abundant to the north, is quite rare in the county, except in a cultivated state, where, in the ordinary form or in the changed condition, under the name of "Snowball Tree," it is common. The only native locality yet noticed, is that in the deep Wenham Swamp, where there are several large plants.

**Viburnum lantanoides**, *Michx.* (HOBBLE-BUSH.) The flowers of this species much resemble those of the last, except perhaps that they are larger. The shrub is more straggling, however, and it is more abundant, growing in nearly all the old deep woods of the county, from Rockport to the Merrimac River.

## RUBIACEÆ.

(MADDER Family.)

**Cephalanthus occidentalis**, *L.* (BUTTON-BUSH.) A dense, irregular shrub. Common in all wet places, and often having a very stout central trunk.

## COMPOSITÆ.

**Iva frutescens**, *L.* (MARSH ELDER.) Common near the salt marshes. It often has a stem half an inch or more in diameter.

## ERICACEÆ.

(HEATH Family.)

**Gaylussacia dumosa**, *T. & G.* Var. *hirtella*. Gloucester Mrs. Kettel. Rare.

**Gaylussacia frondosa**, *T. & G.* (DANGLEBERRY.) "Lynn," Tracy, Gloucester (Magnolia Swamp). Scarce.

**Gaylussacia resinosa**, *T. & G.* (COMMON HUCKLEBERRY.) It is common everywhere, and has the best fruit of any of this family.

**Vaccinium Oxycoccus**, *L.* (SMALL CRANBERRY.) Although this species has been often reported as being found within the county, yet the writer has not seen authentic specimens.

**Vaccinium macrocarpon**, *Ait.* (LARGE CRANBERRY.) Common in low ground throughout. Particularly fine in the hollows of Plumb Island.

\* **Vaccinium Vitis-Idæa**, *L.* (COWBERRY.) First noticed by Oakes & Osgood, at Danvers, about 1820, where is the only locality yet found in the state. Fortunately the place is not generally known, and this rare plant is not likely to be exterminated at present.

**Vaccinium Pennsylvanicum**, *Lam.* (DWARF BLUEBERRY.) The commonest and earliest of this genus.

**Vaccinium vacillans**, *Solander.* Smaller than the last. Quite common on dry hills.

**Vaccinium corymbosum**, *L.* (SWAMP OR HIGH BLUEBERRY.) Very abundant in all low lands. It is a variable plant, often growing to considerable size, with a trunk 2 inches in diameter.

**Chiogenes hispidula**, *T. & G.* (CREEPING SNOWBERRY.) Georgetown, *Mrs. Horner*, Essex Woods, etc. Scarce.

**Arctostaphylos Uva-ursi**, *Spreng.* (BEARBERRY.) Danvers, Peabody, Gloucester, etc. A variety having red flowers is found in Boxford by *Mrs. Horner*.

**Epigæa repens**, *L.* (MAY FLOWER. TRAILING ARBUTUS.) Gloucester, Topsfield, Boxford, "Salisbury," *J. G. Whittier*, Lawrence, *Miss Cabot*. Scarce. In localities once yielding abundance of flowers it is fast being exterminated by over-zealous collectors.

**Gaultheria procumbens**, *L.* (CHECKERBERRY.) Very common everywhere.

**Leucothoë racemosa**, *Gray.* Dr. Chas. Pickering remembered having collected this plant somewhere in the county, about 1824, but it was very scarce.

**Cassandra calyculata**, *Don.* Common around the borders of ponds.

**Andromeda polifolia**, *L.* This beautiful little plant is very scarce, the localities in Wenham and Danvers being the only ones well known.

**Andromeda ligustrina**, *Muhl.* A shrub of considerable size, resembling a High Blueberry. Common along roadsides and in the woods.

**Clethra alnifolia**, *L.* Very abundant. When in flower a most fragrant plant.

**CALLUNA VULGARIS**, *Salisb.* (COMMON HEATH.) The well-known locality at Tewksbury is quite near Essex County, but it has been since found in Andover. It hardly seems possible that this can be other than an introduced plant.

**Kalmia latifolia**, *L.* (MOUNTAIN LAUREL.) Abundant from Gloucester northwestward, and along the Merrimac River. The flowers vary much in color, from white to deep pink. A variety having double flowers was collected in Gloucester, by Mr. G. D. Phippen.

***Kalmia angustifolia*, L.** (LAMBKILL, SHEEP LAUREL.) Common in pastures.

***Kalmia glauca*, Ait.** Mr. S. P. Fowler states that he found this species at Wenham, growing with the *Andromeda polifolia*; and Dr. Chas. Pickering collected it, he thought in Gloucester, about 1845, but it has not been seen of late.

***Azalea viscosa*, L.** (SWAMP PINK.) Common in wet places. Var. *glauca*, with the under sides of the leaves white; grows near Wenham Pond.

***Azalea nudiflora*, L.** (PURPLE AZALEA.) Reported from one or two localities, but not represented in the Essex County collection at the Peabody Academy of Science.

***Rhodora Canadensis*, L.** This beautiful plant is to be found in nearly every part of the county, sometimes growing six feet high.

***Ledum latifolium*, Ait.** Dr. Chas. Pickering collected this species in the county, about 1824.

[*Moneses uniflora*, four species of *Pyrola*, and the two species of *Chimaphila*, are found in the county.]

## AQUIFOLIACEÆ.

(HOLLY Family.)

***Ilex opaca*, Ait.** (AMERICAN HOLLY.) This plant, so abundant on Cape Cod, is found on Cape Ann in one locality where there are a few trees in an out-of-the-way place, whether introduced by man or by other means, it is not known. Specimens have been communicated from this locality, by Mr. Frank Lufkin, of Pigeon Cove.

***Ilex verticillata*, Gray.** (BLACK ALDER.) The beautiful scarlet berries of this species make it very attractive in the fall, along roadsides, where it is common.

***Ilex lævigata*, Gray.** This resembles the last, but is not so abundant.

***Ilex glabra*, Gray.** (INKBERRY.) The fruit of this species is black. It is found in the Wenham and Magnolia swamps.

***Nemopanthes Canadensis*, D C.** (MOUNTAIN HOLLY.) Found in various moist localities throughout the county, forming at times a tree of considerable size.

## BIGNONIACEÆ.

(BIGNONIA Family.)

*Tecoma radicans*, and the *Catalpa bignonioides*, natives westward, are always found in cultivation in the older towns.

## SOLANACEÆ.

(NIGHTSHADE Family.)

*SOLANUM DULCAMARA*, *L.* (BITTER-SWEET), and better known here as nightshade, often forms quite a shrub. The plant is not poisonous to handle, as many persons suppose, but the fruit may be poisonous to eat.

*LYCIUM VULGARE*, *Dunal.* (MATRIMONY VINE.) Much cultivated in old gardens, and often found escaped along walls.

## OLEACEÆ.

(OLIVE Family.)

*SYRINGA VULGARIS*, *L.* (LILAC), always found in old gardens, now and then escapes, and is seen in quite out-of-the-way places.

*LIGUSTRUM VULGARE*, *L.* (PRIVET. PRIM.) Thoroughly naturalized in Danvers, Beverly, etc., sometimes growing 20 feet high.

*Chionanthus Virginica*, *L.* (FRINGE TREE.) A native of Pennsylvania. It is often seen in cultivation.

*Fraxinus Americana*, *L.* (WHITE ASH.) This valuable tree is abundant in all parts of the county, but rather as a roadside tree than in groves of any extent. Old trees attain great size. Mr. Sears gives the measurements of several, among which one in Danvers was in 1864, 12 feet in circumference, 65 feet high, with a spread of branches 60 feet in diameter. Five others in Danvers were from 7 to 9 feet in circumference three feet from the ground, and from 60 to 75 feet high.

Two noble specimens of this species were felled on Essex street, Salem, a few years since, leaving stumps over three feet in diameter, and sound to the heart.

The largest specimen noticed, measured by Mr. C. Cooke and the writer, in 1876, on Cabot St., Beverly, was,

Circumference 11 feet 6 inches, 1 foot from ground.

" 8 " 7 1/2 " 6 feet " "

Height about 80 feet.

*Fraxinus pubescens*, *Lam.* (RED ASH.) Frequently seen in various parts of the county, but seldom attaining great size.

*Fraxinus sambucifolia*, *Lam.* (BLACK ASH.) Growing in low lands, mostly with other trees, where they often reach a height of 60 feet, with a diameter of 12 to 18 inches at the butt.

## LAURACEÆ.

(LAUREL Family.)

*Sassafras officinale*, *Nees.* The Sassafras is by no means a



common tree in Essex County, yet there are several fine specimens to be found, and young trees are frequently met with. Mr. Sears noticed one tree in Beverly 5 feet 4 inches in circumference three feet from the ground, with a height of about 50 to 60 feet, and another in Danvers was 5 feet 6 inches at one foot from the ground, and about 60 feet high.

The largest specimen, however, yet noticed in the county, is the old tree fast going to decay, at Manchester, in a field quite near the town, which, in 1875, measured,

Circumference 8 feet 10 inches, 2 feet from the ground.

" 6 " 10 " 6 " " " "

Height about 40 feet.

**Lindera Benzoin**, *Meisner*. (SPICE-BUSH.) A shrub of considerable size, frequently found in damp woods.

## THYMELACEÆ.

(MEZEREUM Family.)

**DAPHNE MEZEREUM** was found, evidently escaped, perhaps from seeds carried by birds, in Ipswich, by Dr. Palmer, in 1870, and later in Salem, by Henry Patch. The same thing occurred at Portland, where Dr. Wm. Wood found the plant in quite a remote situation.

*Dicra palustris* is probably not a native of the county, but common farther northward. It is occasionally met with in cultivation.

## URTICACEÆ.

(NETTLE Family.)

**Ulmus fulva**, *Michx.* (SLIPPERY ELM.) Georgetown (Mrs. Horner), Wenham, Boxford. This tree is comparatively rare in the county, but still is found growing to considerable size, seldom, however, over a foot in diameter, or over 35 feet high.

**Ulmus Americana**, *L.* (WHITE ELM.) Although the Connecticut Valley is the region where this species arrives at its greatest perfection, yet Essex County can boast of many magnificent specimens of this noble Elm, which, planted as a shade tree, in proper situations, has no equal. It is greatly to be regretted that the largest of these trees seem to be dying out, and few are likely to replace them in the next generation.

In form, the county Elms vary as in other localities, in regard to shape, having the "Oak," "Vase," and intermediate forms. Mr. Sears gives the measurements of several, among which one in Lynn is,

Circumference 11 feet 4 inches, 1 foot from ground.

" 10 " 5 feet " "

Five very erect limbs rise to the height of perhaps 80 feet where they spread suddenly forming a flat top with a pendant border. The Elm before the residence of Mr. John Hale, in Boxford, planted in the year 1745, measured in 1860, was,

Circumference 19 feet, 1 foot from the ground.

" 13 " 5 feet " " "

Diameter of the spread of the branches, 100 feet.

In 1865 the tree known as the Zadoc Wilkins Elm, in Danvers, measured,

Circumference 16 feet 6 inches, 1 foot from ground.

" 12 " 6 " 4 feet " "

" 10 " 8 " 6 " " "

Spread, diameter 68 feet. Height 80 feet.

The same tree in 1875, measured,

Circumference 17 feet 0 inches, 1 foot from ground.

" 13 " 3 " 4 feet " "

" 11 " 4 " 5 " " "

Spread and height about the same.

The fine Elm in Peabody, on the old Endicott estate, measured by the writer in 1875 (May), was,

Circumference 20 feet 1 inch, 2 feet from ground.

" 17 " 2 inches 6 " " "

where the trunk was the least size.

At 15 feet from the ground the trunk divided into sixteen branches, which were quite erect, forming a fine head 80 or 90 feet high.

The Woodbury Elms at North Beverly, were in 1875 respectively, 12 feet 10 inches and 14 feet 8 inches at 6 feet above the ground. Another old tree at the corner of Cabot and Balch Sts., felled in 1878, measured in 1875, 16 feet 4 inches at 6 feet. Mr. W. P. Upham kindly furnishes the following notes on the Boxford Elms. The Hubbard Elm in Boxford, undoubtedly the largest in the county, measured in 1858, was 16 feet 8½ inches in circumference at 6 feet from the ground. The same tree measured in 1877, was 17 feet 10½ inches at the same place.

The Hale Elm, previously mentioned, also in Boxford, measured in 1877, was 12 feet 8 inches at 6 feet from the ground, and is without exception the most graceful tree to be found in the county. The diameter of its spread is 107 feet 6 inches. Many of the branches drop to within a few feet of the ground.

ULMUS CAMPESTRIS. (EUROPEAN ELM), and perhaps others are now and then met with under cultivation.

*Celtis occidentalis*, L. (NETTLE TREE, HACKBERRY.). Fine specimens of the flowers, leaves, and fruit of this tree are in the herbarium of the Peabody Academy of Science, collected in Ipswich,

by the late Mr. Wm. Oakes. Mr. S. P. Fowler states that a tree some 10 inches in diameter formerly stood in Topsfield. The only localities we now know for this rare tree are at the summit of one of the dunes at Plumb Island, where there are several trees apparently some forty years old, yet scarcely fifteen feet high, most of them being much smaller, with a diameter of three inches at the but; and the fine specimens between Salem and Lynn. Among the trees in the last named locality, one specimen is

Circumference 4 feet 1 inch, at 1 foot from the ground.  
 " 3 " 3 inches, at 3 feet from the ground.  
 Height, 20 feet.

Two others are nearly as large.

MORUS ALBA, *M. rubra*, and *M. NIGRA*, are to be found cultivated, some of them occasionally reaching large size.

## PLATANACEÆ.

(PLANE TREE Family.)

*Platanus occidentalis*, L. (BUTTONWOOD.) It is difficult to say whether this tree is a true native of the county or not, but, judging from the situation of some old trees, it seems very probable that it may be. There are few trees of this species which now have other than a rough and straggling appearance, as they seldom recover from the effect of a severe season before another shock returns them to their former forlorn condition. The trees in cultivation often are found of great size, varying from 10 to 18 feet in circumference, and often 75 feet high.

## JUGLANDACEÆ.

(WALNUT Family.)

*Juglans cinerea*, L. (BUTTERNUT.) This is a tree of rapid growth, but short lived. It is abundant in Danvers, Topsfield, and the towns in that region. When growing with other trees it often reaches a height of 60 feet, but alone, as it is usually seen, it rarely exceeds 40 feet. Trees rather more than twenty years old are often 4 feet in circumference 6 inches from the ground. Several specimens measured by Mr. Sears in Topsfield were 8 and 9 feet in circumference, while an old tree felled in Danvers measured, in 1873, where it was cut off,

Circumference 12 feet 6 inches  
 " 10 " 5 " 4 feet above.

This tree was, however, unsound. The fruit of the Butternut when properly dried has a most excellent flavor.

*Juglans nigra*, L. (BLACK WALNUT.) A native farther west, but probably introduced here, although Mr. J. C. Peabody, of Newbury-

port, has communicated specimens of the nuts from trees growing in his neighborhood which he is confident are natives.

The fine old tree felled on the Treadwell Estate, Salem, in 1877, was 10 feet 4 inches in circumference at 1 foot from the ground, and about 70 feet high. The tree was about 74 years old. A section from the but of this tree is in the collection of the Academy at Salem.

**JUGLANS REGIA, L.** (ENGLISH WALNUT.) This tree is cultivated to a limited extent in Salem, and, according to Tracy it was planted by the early settlers at Saugus, where it now grows wild.

**Carya alba, Nutt.** (SHAG-BARK HICKORY.) A stately tree, common in most parts of the county. The finest specimens, however, we have noticed, being along the Merrimac Valley. Mr. Sears, in 1873, measured several trees on the land of Mr. Augustus Fowler, of Danvers, that had been growing for forty-nine years, they averaged,

Circumference 4 feet 6 inches, 1 foot from ground.

" 2 " 2 " 6 feet " "

height about 50 feet.

Four others twenty-eight years old in 1875, averaged 3 feet in circumference at 1 foot from the ground. Several trees measured by Mr. Sears and the writer, in Topsfield, were 7 and 8 feet in circumference and from 60 to 70 feet high. One at Boxford was,

Circumference 8 feet 4 inches, 1 foot from ground.

" 6 " 3 " 4½ feet " "

Spread 53 feet in diameter.

Height about 80 feet.

A fine specimen of this tree on the neck of land between the Merrimac and Shawsheen rivers, measured by Mr. N. Ropes and the writer in 1875, was,

Circumference 8 feet 9 inches, 1 foot from ground.

" 6 " 9½ " 6 feet " "

Height about 75 feet.

Many fine trees of this species are to be found in pastures spared for the shade which they afford to cattle. The fruit is the best and sweetest Hickory of the markets.

**Carya tomentosa, Nutt.** (WHITE-HEART HICKORY.) This is a comparatively rare tree, the least abundant of the genus. Danvers (J. H. Sears).

**Carya porcina, Nutt.** (PIG-NUT HICKORY.) The large trees of this species are fast being felled, although many are yet to be found of considerable size. The tree is abundant in all parts of the county.

**Carya amara, Nutt.** (BITTER-NUT HICKORY.) Often found 2 feet or even more in diameter, and in Boxford and Topsfield, where the tree is very abundant, there is found considerable variation in the foliage of different specimens. The hickories are among the cleanest



of all our trees, and are certainly valuable, as they flourish luxuriantly in our climate.

## CUPULIFERÆ.

(OAK Family.)

**Quercus alba, L.** (WHITE OAK.) The demand for ship timber has caused most of the large trees of this species to be felled, and it can only be said that the trees of younger growth are abundant.

A large healthy tree growing in a damp pasture in the rear of the Pingree Estate, in Topsfield, measured by Mr. Sears and the writer in 1875, was,

Circumference	19 feet	7 inches,	1 foot	from the ground.
"	16 "	8 "	3 feet	" " "
"	12 "	11 "	5 "	" " "

The spread averaged about 75 feet in diameter. Two trees on the Burley Farm, Danvers, measured by Mr. Sears, were,

(1)	Circumference	19 feet	0 inches,	ground measure.
	"	13 "	6 "	at 6 feet above.
	Height	70 feet.	Spread	80 feet.
(2)	Circumference	17 feet	10 inches	at ground.
	"	12 "	0 "	at 5 feet above.
	Height	80 feet.	Spread	80 feet.

Five large White Oaks on land belonging to the late Francis Curtis, of Boxford, were measured in 1875 by Mr. Sears and the writer. Taking the most easterly tree as number one, passing towards the west, and counting the one higher on the hillside to the north as number five, they measured as follows,

(1)	Circumference	11 feet	10 inches,	1 foot	from ground.
	"	10 "	1 inch	6 feet	" "
	Spread	65 feet.	Height	60 feet.	
(2)	Circumference	12 feet	6 inches,	1 foot	from ground.
	"	11 "	2 "	6 feet	" "
	(Tree partly dead.)				
(3)	Circumference	14 feet	4 inches,	1 foot	from ground.
	"	11 "	1 inch	5 feet	" "
	Spread	80 feet.	Height	65 feet.	
(4)	Circumference	13 feet	0 inches,	1 foot	from ground.
	"	11 "	4 "	5 feet	" "
	"	10 "	11 "	7 "	" "
	Height	60 feet.	Spread	60 feet.	
(5)	Circumference	15 feet	3 inches,	1 foot	from ground.
	"	10 "	11 "	5 feet	" "
	Height (top gone)	50 feet.	Spread	85 feet.	

In Danvers, on a lot from which the wood was cut in 1828, is a White Oak, which in 1860 measured 3 feet 1 inch at the ground. The same tree in 1867, was 3 feet 7 inches, and in 1875, 4 feet 2 inches and 30 feet high.

In company with Mr. Wm. Merrill and Mr. W. P. Conant, two trees of this species growing upon moist, loamy soil at West Newbury, on land of Mr. Sawyer, measured,

- (1) Circumference 15 feet 10 inches, 2 feet from ground.

" 11 " 9 " 8 " " "

Spread 84 feet.

- (2) Circumference 16 feet 1 inch, 2½ " " "

" 11 " 8 inches, 6 " " "

**Quercus bicolor, Willd.** (SWAMP WHITE OAK.) Abundant on wet land in all parts of the county.

Emerson mentions one on the land of Mr. Jaquith, of Newbury, which in 1839 measured 12 feet 1 inch in circumference at 4 feet from the ground. One measured by Mr. Merrill and the writer on the Sawyer place, was 11 feet 7 inches at 3 feet from the ground, and one in Wenham Swamp near the Ipswich River, measured in 1876, was 8 feet 4 inches at 6 feet from the ground. The leaves of this species vary much in shape, cutting, and regarding the tomentum on the underside. Dr. Chas Pickering informed the writer that the frame of the old Pickering mansion in Salem, was hewn from Swamp White Oaks, which then (1650) grew in the vicinity.

**Quercus Prinus, L.** (CHESTNUT OAK.) This species is rare in the county, only yet having been reported in Georgetown, Mrs. Horner, and Boxford. It is probable all the trees yet noticed should be referred to the variety *acuminata*, Michx. (*Q. Castanea*, Muhl.) There are some quite interesting forms of this species growing in the county, which require more careful observation in their various stages of growth. The largest tree yet noticed was but 5 inches in diameter 4 feet from the ground.

**Quercus prinoides, Willd.** (CHINQUAPIN OAK.) Common in Topsfield, Boxford, etc., but not seen in the southern or eastern parts of the county. This species is never more than a tall shrub.

**Quercus ilicifolia, Wang.** (BEAR OAK. SCRUB OAK.) Common on poor soil, in Lynnfield, Danvers, Topsfield, and that neighborhood, and to be found in many other parts of the county. Although this is rarely more than a shrub it sometimes takes the tree form, growing 20 feet high, with a trunk 4 inches in diameter. The fruit varies considerably in appearance, suggesting the idea of hybrids. The late Dr. Robbins describes a hybrid between this species and the Black Oak, which he found at Northbridge, Mass. The leaves also vary much in shape and cutting.

**Quercus coccinea, Wang.** (SCARLET OAK.) Abundant, but rarely growing to the size of the Yellow-barked or Black Oak.

Var. *tinctoria* (*Q. tinctoria*, Bartram), which is found sometimes 3 feet in diameter and 70 feet high. *Q. coccinea* has the most beautiful

leaves as regards cutting, of any of our Oaks. In the last edition of Emerson's "Trees of Massachusetts," it is impossible to distinguish two plates, one of which is marked *Q. coccinea*, the other *Q. rubra*. It is undoubtedly an accidental mistake.

**Quercus rubra, L. (RED OAK.)** This species is common throughout the county, often growing to great size. It is easily distinguished from the other Oaks by the large acorns. A Red Oak in Manchester measured, in 1875 by Mr. N. Ropes and the writer, was;

Circumference 11 feet 11½ inches, 1 foot from the ground.  
 " 9 " 7 " 6 feet " " "

One at Swampscott was 11 feet 9 inches at 1 foot from the ground.

On the Sawyer place, previously referred to, in 1877 Mr. Wm. Merrill and the writer measured one huge Red Oak which had been felled. At the place where it was cut it was,

Circumference 23 feet 10 inches  
 " 16 " 4 " 2 feet above.  
 " 14 " 4 " 5 " "  
 " 12 " 10 " 13 " "

Another still flourishing, was,

Circumference 15 feet 2 inches, 2 feet from ground.  
 " 12 " 4 " 5 " " "

The Pin-Oak (*Q. Palustris*) has not yet been noticed, but still ought to be found.

**Castanea vesca, L. (CHESTNUT.)** The Chestnut is found from Lynn to the Merrimac Valley, but, except under cultivation, is rarely seen in the eastern portion of the county. Undoubtedly the finest trees are those of the Burley woods in Danvers, some of which must be upwards of one hundred years old. Among these Mr. Sears measured two which were,

(1) Circumference 11 feet 0 inches at the ground.  
 " 8 " 0 " 5 feet above.  
 Height 90 feet.

(2) Circumference 10 feet 7 inches at the ground.  
 " 6 " 7 " 6 feet above.  
 " 6 " 5 " 15 " "  
 Height 85 feet.

The Chestnut is one of the easiest trees to cultivate among our native species, and of very rapid growth under favorable circumstances. Hon. Benj. Perley Poore has, at "Indian Hill," his summer residence, a fine row of Chestnuts which he planted in 1848. Sept., 1877, he politely gave the writer an opportunity to measure them, as

well as other trees which he has from time to time planted for experimental purposes. Five of the trees measured as follows,

(1)	Circumference	7 feet 4 inches,	2 feet from ground.				
	"	5 "	7 "	6 "	"	"	"
(2)	"	6 "	9 "	2 "	"	"	"
	"	5 "	5 "	6 "	"	"	"
(3)	"	7 "	5 "	2 "	"	"	"
	"	5 "	7 "	6 "	"	"	"
(4)	"	5 "	10 "	2 "	"	"	"
	"	5 "	1 "	6 "	"	"	"
(5)	"	7 "	1 "	2 "	"	"	"
	"	5 "	8 "	6 "	"	"	"

The average height of the trees was perhaps 40 feet.

**Fagus ferruginea, Ait.** (BEECH.) This tree is not very common throughout the county, but here and there forms quite large groves, noticeable in the Chebacco Pond region at Hamilton, where are several such. In the vicinity of Danvers, the Beech seldom is found more than 15 or 20 inches in diameter, but in Andover and along the Merrimac, much larger trees are often seen. Two such near the Shawsheen River at Sutton's Mills are over 8 feet in circumference.

**Corylus Americana, Walt.** (WILD HAZEL-NUT.) Abundant along roadsides, forming a shrub 5 or 6 feet high. The nuts are seldom seen in the market, although very good.

**Corylus rostrata, Ait.** (BEAKED HAZEL-NUT.) Not so common as the last species, but resembling it closely. It is found at Wenham, Topsfield, Danvers, Gloucester, etc.

**Ostrya Virginica, Willd.** (HOP-HORNBEAM.) Common in various parts of the county, but rarely growing in groves. The tree somewhat resembles the Elm, and seldom reaches a diameter of more than 1 foot. Mr. Sears found three in Wenham, of which two were  $4\frac{1}{2}$  feet in circumference at 5 feet from the ground, and the third was 9 feet at 5 feet, and 10 feet at 7 feet above the ground, where it branches.

**Carpinus Americana, Michx.** (AMERICAN HORNBEAM. BLUE BEECH.) Not so common as the last, but found from Danvers to the Merrimac Valley. The bark resembles that of the Beech, and the wood has a very close grain. This tree is seldom found over 6 inches in diameter.

## MYRACACEÆ.

(SWEET GALE Family.)

**Myrica Gale, L.** (SWEET GALE.) A low shrub with fragrant leaves, common along streams and around ponds.

**Myrica cerifera, L.** (BAYBERRY.) Equally common, but found upon hillsides in pasture land rather than in wet places.



**Comptonia asplenifolia, Ait.** (SWEET FERN.) A low shrub common in all parts.

## BETULACEÆ.

(BIRCH Family.)

**Betula lenta, L.** (SWEET OR BLACK BIRCH.) A tree growing to considerable size, and found in many parts of the county abundantly. Tracey speaks of it as being rare in Lynn.

**Betula lutea, Michx. f.** (YELLOW BIRCH.) Also a common tree, and occasionally reaching greater size than the last. Mr. Sears measured several fine specimens of this species in the Essex woods, which were more than 8 feet in circumference, and over 60 feet high.

**Betula alba, var. populifolia, Spach.** (AMERICAN WHITE BIRCH.) This tree rarely attains great size. One on Winter St., Salem, being 5 feet in circumference 3 feet from the ground, is the largest noticed. The White Birch frequently springs up in great numbers after a hill-side has been cleared of other trees, and also along roadsides, where the young trees are exceedingly graceful.

**Betula papyracea, Ait.** (PAPER OR CANOE BIRCH.) There are a few fine specimens of this species on the northwest shore of Wenham Pond, a few in Salem pastures, and others scattered through the southern and eastern portions of the county, but only through Boxford and the Valley of the Merrimac are they frequently met with. Mr. Sears measured a fine tree in Danvers, which was,

Circumference 8 feet 0 inches at the ground.

“ 5 “ 6 “ “ 6 feet above.

Height about 55 feet.

**Betula nigra, L.** (RED OR RIVER BIRCH.) The only localities for this Birch seem to be in the northwestern part of the county. Emerson speaks of it as growing “along the Spicket River and in the neighboring swamps of Methuen.” It also abounds at the junction of the Shawshen and Merrimac rivers, where the trees overhang the water. Many are 12 to 18 inches in diameter.

**Betula pumila, L.** (LOW BIRCH.) Reported at North Andover (Proc. Essex Inst., Vol. II, p. 402); also at Rockport. No specimens have been preserved, and the fact of its being an Essex County plant is doubted.

**Alnus incana, Willd.** (SPECKLED ALDER.) Common in low land, forming in some cases almost a tree. A group of them stood on a swampy piece of land in North Beverly a few years since, many specimens of which were 25 feet high, with a diameter of 5 inches at the butt.

**Alnus serrulata, Ait.** (COMMON ALDER.) Abundant as a shrub in all low grounds.

## SALICACEÆ.

(WILLOW Family.)

**Salix candida**, Willd. (HOARY WILLOW.) This species, which so far has only been observed in a bog at Boxford, was first detected by the writer, Aug., 1875. The plants are abundant (both sexes), extending over a mile of land. This is probably the first New England locality noticed.

**Salix tristis**, Ait. (DWARF GRAY WILLOW.) Lynnfield, Middleton, Ipswich (Oakes), etc. Mr. Oakes also found the var. **microphylla** at Ipswich.

**Salix humilis**, Marshall. (PRAIRIE WILLOW.) Quite common in dry places. Nearly all the species of low-growing willows occasionally are found to have cones at the terminations of some of their branches. These are the result of a sting by a fly, which causes the twig to become aborted and the leaves to appear only as scales, forming a persistent cone, which, by those persons unacquainted with the fact, is supposed to be a natural production of the plant.

**Salix discolor**, Muhl. (GLAUCUS OR PUSSY WILLOW), (including also *S. eriocephala*, Michx.) This is one of the earliest flowering willows, and is very common in all places. The largest specimen of this species met with is in a yard in West Peabody, near the Newburyport turnpike. The tree is about 30 feet high, and 5 feet in circumference near the ground.

**Salix sericea**, Marshall. (SILKY WILLOW), (including *S. grisea*, Willd.) Along streams, Topsfield, etc. Not very common. A shrub 6 to 10 feet high.

**Salix petiolaris**, Smith. Topsfield, *J. H. Sears*, Andover, Middleton, etc. Not uncommon.

**SALIX PURPUREA**, L. (PURPLE WILLOW.) Introduced at Salem, Newburyport, Lynn, and other places. A shrub or low tree.

**SALIX VIMINALIS**, L. (BASKET OSIER.) Also introduced at Danvers and Salem, besides other places.

**Salix cordata**, Muhl. (HEART-LEAVED WILLOW.) Quite common in low lands.

**Salix livida**, Muhl., var. **occidentalis**. (GOLDEN WILLOW.) Common on dry land. A low shrub.

**Salix lucida**, Muhl. (SHINING WILLOW.) Along streams and by ponds. This grows to be a large shrub.

**Salix nigra**, Marshall., var. **falcata**. (BLACK WILLOW.) Chebacco Pond. Topsfield along the Ipswich River, etc. This forms a tree 25 feet high, and from 4 to 6 inches in diameter at the but.

**SALIX FRAGILIS**, L. (BRITTLE WILLOW.) This includes several varieties, and so closely resembles the White Willow that it is

difficult to determine specimens. It is, as the next, an introduced species, but growing in a few places only in the county.

*SALIX ALBA, L.* (WHITE WILLOW.) This is by far the most abundant of the introduced Willows, as it is also the largest. It has been so extensively propagated by cuttings, that for miles one may search and find among hundreds of trees, only the male form. They are cut frequently, and are of exceedingly rapid growth. Three trees on the land of Mr. Aug. Fowler, of Danvers, measured by Mr. Sears, were as follows,

- |     |               |          |            |          |              |
|-----|---------------|----------|------------|----------|--------------|
| (1) | Circumference | 18 feet  | 10 inches, | 1 foot   | from ground. |
|     | "             | 13 "     | 3 "        | 6 feet   | " "          |
|     | Spread        | 90 feet. | Height     | 35 feet. |              |
| (2) | Circumference | 15 feet  | 0 inches,  | 1 foot   | from ground. |
|     | "             | 12 "     | 10 "       | 6 feet   | " "          |
| (3) | "             | 14 "     | 3 "        | 1 foot   | " "          |
|     | "             | 15 "     | 3 "        | 4 feet   | " "          |
|     | "             | 16 "     | 10 "       | 6 "      | " "          |

A tree in Wenham by the saw-mill of Mr. John Dodge, planted in 1786, was measured in 1873, as follows,

Circumference	18 feet	10 inches,	1 foot	from ground.
"	17 "	3 "	5 feet	" "

When growing naturally this species forms a fine tree, a noticeable specimen being the one on the Salem and Boston turnpike, near the Swampscott road.

*SALIX BABYLONICA, Tourn.* (WEeping WILLOW.) Extensively planted as an ornamental tree. Only the fertile plant has been introduced, as it is stated the male plant is not so drooping, hence less graceful.

*Salix myrtilloides, L.* A very small shrub, growing in bogs at Danvers, *J. H. Sears*, Boxford, Hamilton, Essex, Topsfield. *Oakes*. Rather rare.

Emerson does not mention this or the first species in his "Trees and Shrubs of Massachusetts," and in the second edition omits *S. viminalis* and *S. purpurea*.

*Populus tremuloides, Michx.* (AMERICAN ASPEN.) Very abundant in Wenham, Hamilton, Topsfield, Danvers, Lynnfield, etc., but somewhat less so in the other parts of the county. It seldom attains any great size.

*Populus grandidentata, Michx.* (LARGE-TOOTHED ASPEN.) In similar situations to the last, but of larger growth. The largest tree of this species noticed here, is on one of the islands in Wenham Swamp, which measured by Mr. Sears and the writer, in 1875, was,

Circumference	7 feet	10 inches	at the ground.
"	5 "		at 5 feet above.
Height	about 70 feet.		

*Populus balsamifera*, L., var. *candicans*. (BALM OF GILEAD.) Not a native of the county, but very extensively introduced. It is a tree of rapid growth. A fine specimen at the foot of Daniels St., Salem, planted about the year 1790, measured in 1875, was 13 feet in circumference 4 feet from the ground. Another beside it was nearly as large. Their height was about 70 feet.

*POPULUS DILATATA*, Ait. (LOMBARDY POPLAR.) Introduced early as an ornamental tree along old roads, where the ruins of many are now to be seen.

*Populus alba*, L. (SILVER-LEAVED POPLAR.) Also introduced as an ornamental and shade tree. There are many to be found in the cities and old towns, 10 or 12 feet in circumference.

## CONIFERÆ.

(PINE Family.)

*Pinus rigida*, Mill. (PITCH PINE.) One of our commonest forest trees, growing in all parts of the county. Very few trees are to be found of large size, and as a general thing they are of slow growth. Mr. Sears measured several trees of this species in Beverly, which were 6 feet in circumference at the ground, one being,

Circumference 6 feet 10 inches, 2 feet from ground.

“ 6 “ at 5 feet above.

Height 80 feet.

*Pinus resinosa*, Ait. (RED PINE.) On the land of Mr. John Dwinnell, of Boxford, is undoubtedly the finest grove of Red Pines to be seen in this part of the state. There are perhaps eighty trees, most of them nearly 90 feet high, the largest 7 feet in circumference. They are on the southern slope of a hill which borders on a swamp, and as the forests around them have been cut away it is to be feared that this little grove will be injured by exposure to the severe winds. In the vicinity are to be found a few small trees, seedlings from the older ones in the grove. Only a very few Red Pines are reported in any other part of the county. Georgetown, *Mrs. Horner*, West Newbury, *Wm. Merrill*. Two trees at Peabody, *Mr. Brown*, one tree at Andover, *Prof. Goldsmith*.

*Pinus Strobus*, L. (WHITE PINE.) The White Pine may be considered as the forest tree of Essex County, so greatly does it predominate over other species.

Mr. Sears was informed by old residents of Boxford, that eighty years ago the woods of that town consisted chiefly of Hickories and Oaks, where now the Pine is the only tree. From the statements of various persons it would appear that the pines in the region of Beverly were now growing at a faster rate than those near Danvers and Topsfield, owing perhaps to the exhaustion of the proper elements in the soil of



the last named places. On land in Georgetown known as "the ridges," are some of the largest pines now remaining in perfection.

One measured by Mr. Sears in 1860, was,

Circumference 14 feet 6 inches, 1 foot from ground.  
 " 14 " 0 " 6 feet " "

The first limb branched at 40 feet from the ground. The top of the tree had been broken off. In the same region Mr. Sears measured seven trees, which averaged 12 feet in circumference at 2 feet from the ground. In 1850 there were growing in "Blind Hole," Danvers, many White Pines over 8 feet in circumference, and in 1858, one, since felled, measured above the root,

Circumference 16 feet 3 inches.  
 " 15 " 7 " 4 feet above.

The first limb was at 30 feet from the ground, the tree being nearly 120 feet high. The "Preston Pine" at Danvers, is 10 feet 4 inches at 2 feet from the ground, and seeming not much less at 40 feet above. It is about 90 feet high.

A grove of pines at Hamilton, measured by Mr. James Bartlett and the writer in 1875, averaged 6 feet in circumference at 5 feet above the ground.

A huge tree with a double top, in Boxford, measured by Mr. Sears and the writer, in 1875, was 13 feet in circumference at the ground, 11 feet 6 inches at 6 feet above. Height about 80 feet. Spread from east to west 88 feet.

*PINUS SYLVESTRIS* (SCOTCH PINE) and *PINUS AUSTRIACA* (AUSTRIAN PINE) are extensively planted as ornamental trees. The former has been noticed to spread from seeds, to a limited extent, in Danvers.

*Abies nigra*, *Poir.* (BLACK SPRUCE.) This is a rather scarce tree in most parts of the county, but in the region of Essex, Hamilton, and Ipswich, it is more abundant. In "Pine Swamp," are some hundreds of these trees, many of which are nearly 4 feet in circumference 2 feet from the ground. The largest Black Spruce is an old tree over 8 feet in circumference, on high land in Hamilton, where it evidently has been allowed to remain as a boundary tree.

*ABIES ALBA*, *Michx.* (WHITE SPRUCE), only appears as a cultivated tree.

*Abies Canadensis*, *Michx.* (HEMLOCK-SPRUCE.) This most graceful evergreen is quite abundant in many parts of the county. In Wenham Swamp are several trees over 8 feet in circumference, and a large tree in Boxford, with its lower branches nearly touching the ground, measured by Mr. Sears and the writer in 1876, was,

Circumference 11 feet 9 inches at the ground.  
 " 8 " 9 " " 3 feet above.  
 " 8 " 8 " " 6 " "  
 Height about 70 feet.

**ABIES EXCELSA** (NORWAY SPRUCE), is very extensively cultivated, and occasionally **ABIES BALSAMEA** (BALSAM FIR), is used as an ornamental tree, but the latter does not flourish well planted singly.

**Larix Americana**, *Michx.* (AMERICAN LARCH. HACKMATAACK.) The Larch was formerly much more abundant than now, and the present generation of trees of this species seem to be quite unhealthy. In Pine and Wenham Swamps and the regions adjoining are still many trees, but few of them, however, exceed 1 foot in diameter, or a height of 40 feet. Mr. Sears measured, in 1850, several trees in Wenham Swamp, which were 8 feet 6 inches in circumference, and about 70 feet high. Dr. Charles Pickering remembered a tree of this species standing in the town swamp at Wenham in 1823, which was about 4 feet in diameter.

**LARIX EUROPEA.** (EUROPEAN LARCH), grows much better than the American tree when planted out. The "Larch Row" in Wenham, planted by Timothy Pickering about 1802, being the centre from which has been distributed the numerous trees of this species to be seen in Wenham and the adjoining towns. Several of the old Pickering Larches, measured in 1876, averaged 6 feet in circumference 5 feet from the ground.

**Thuja occidentalis**, *L.* (AMERICAN ARBOR VITÆ.) Common in Maine and New Hampshire, where it is called White Cedar. It is seen here only as a cultivated tree, in which condition it is abundant.

**Cupressus thyoides**, *L.* (WHITE CEDAR.) Abundant in swamps in many parts of the county, where it is often met with growing to great size. One old tree in Manchester measured in 1875, was,

Circumference 8 feet 8 inches, 2 feet from ground.  
 " 7 " 7 " 7 " " "

Mr. Sears measured four trees in Boxford, which were respectively, 10 feet 2 inches, 10 feet 3 inches, 11 feet, and 12 feet 5 inches, at 5 feet from the ground. Their height was about 60 feet.

**Juniperus communis**, *L.* (COMMON JUNIPER.) A much detested low evergreen, forming circular patches in pastures, often 30 to 50 feet in diameter. Mr. C. M. Tracy speaks of one in Lynn which he judged to be 200 feet across.

**Juniperus Virginiana**, *L.* (RED CEDAR.) Common on dry hills. On Manchester shore close to the salt water, grows an old Red Cedar, which, measured by Mr. Nath. Ropes and the writer in 1875, was,

Circumference 7 feet 7 inches at the ground.  
 " 7 " 5 " " 6 feet above.  
 Height 12 to 14 feet. Spread 17 feet 8 inches.  
 Ground to branches 9 feet.

This curious tree is said to have been estimated by Prof. Agassiz as

a thousand years old. It is the subject of a fine painting by J. G. Enneking. Other trees on the Beverly shore are quite large. One measured by Mr. C. Cooke and the writer, was 7 feet 1 inch at 2 feet from the ground. As a general thing the trees of this species are rarely over 1 foot in diameter, and 30 feet high.

***Taxus baccata*, L., var. *Canadensis*.** (AMERICAN YEW. GROUND HEMLOCK.) This pretty, low evergreen is found in the deep, damp woods at Manchester, Rockport, Essex, Georgetown, and other places. The English Yew is rarely cultivated. Salem, *Mr. C. M. Richardson*, as an ornamental tree.

Many other Conifers are met with in cultivation, but none are sufficiently common to require their mention in this enumeration of county plants. Perhaps an exception should be made in the case of,

*Taxodium distichum*, Richard. (BALD CYPRESS.) This tree is quite hardy in the county. A specimen on the Derby Estate in Salem, measuring in 1877,

Circumference 10 feet 11 inches at ground.

" 8 " 9 " " "

Height 40 feet.

There is another, not so large, in a garden on Broad St., Salem.

## SMILACEÆ.

(SMILAX Family.)

***Smilax rotundifolia*, L.** (COMMON GREENBRIER.) Among the monocotyledons, this seems almost the only one to mention as a woody plant. It is common in all parts of the county, where its prickly stem is too well known to need farther notice here.

## GRAMINEÆ.

(GRASS Family.)

***Phragmites communis*, Trin.** (REED.) It would hardly be right to omit this plant from our list, for, although not producing a wood which lasts beyond one season, yet the annual stem of the Reed is quite as large as many of the stems produced by exogenous perennials here noticed. This grass grows in Topsfield, and was probably introduced by early settlers for the sake of the stems, which were used in carpet and other looms, which were then common.

The *Phragmites* is a most elegant plant, growing often 10 feet high, with a handsome panicle of flowers.

TUESDAY, JANUARY 21, 1879.

MEETING this day at noon. The PRESIDENT in the chair.

Rev. Albinus Finney Frost, of Salem, elected a resident member.

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MONDAY, FEBRUARY 3, 1879.

REGULAR MEETING this evening.

Mr. THEODORE M. OSBORNE, of Peabody, read an interesting and instructive paper "On Perfect Harmony in Music, and the Enharmonic Keyboard of Prof. Henry Ward Poole," including a sketch of the History of the Musical Scale, and illustrating the subject by diagrams and also by voices and piano.

Abstract of the paper will be printed in the next number of the *Bulletin*.

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FRIDAY, FEBRUARY 28, 1879.

MEETING this evening. HENRY L. WILLIAMS, Esq., in the chair.

Hon. NATHANIEL SILSBEE read an exceedingly interesting paper, upon the Old Merchants of Salem, and their ancient voyages to "the farthest point of the rich east." His paper was made up largely of extracts from the autobiography of his father, the late U. S. Senator Silsbee, interwoven with incidents and anecdotes in the reader's own experience, and replete with valuable lessons and precepts for the young men of the rising generation to consider and copy. The author of the autobiography (Hon. Nathaniel Silsbee) began his nautical education as



a clerk with Nathaniel Bowditch and Richard Cleveland. He passed twenty years of his life in the councils of the State and Nation, ten of which were in the U. S. Congress. Born in Salem, January 14, 1773, he was educated under the charge of Rev. Dr. Manasseh Cutler,—died at Salem, 14 July, 1850. The hall was filled with a large audience, whose interest the speaker held from the beginning to the end of his communication.

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MONDAY, MARCH, 3, 1879.

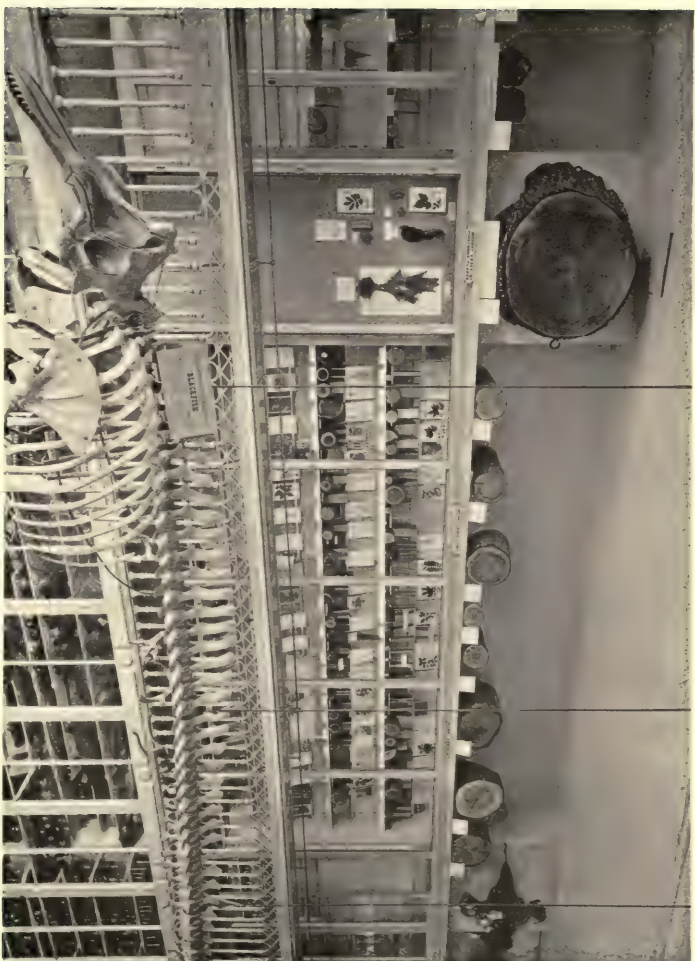
MEETING this evening, and the Rev. De Witt S. Clarke and Mr. H. Bissell both of Salem were elected resident members.

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MONDAY, MARCH 17, 1879.

At the meeting this evening, Mr. J. H. EMERTON, of Salem, gave an account of the artificial hatching of cod fish, and, by drawings on the black board, explained the various apparatus used for this purpose, by the U. S. Fish Commission at their station in Gloucester the past summer.

Mr. RAYMOND L. NEWCOMB, of Salem, read a paper on Halibut fishing on the Banks of Newfoundland. The method of fishing, making of trawls, kinds of bait used, the perils of the fishermen, and other matters pertaining to the subject were fully explained and discussed.



PEABODY ACADEMY OF SCIENCE.

BOTANICAL DEPARTMENT, SHOWING TREES AND SHRUBS OF ESSEX CO.



# BULLETIN

OF THE

## ESSEX INSTITUTE.

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*The Enharmonic Key-board of Prof. Henry Ward Poole.*

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BY THEODORE M. OSBORNE.

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It has long been the great problem of musical theorists to devise a keyed instrument which shall be capable of modulations into different keys, and at the same time be justly intoned for both major and minor intervals in each key, without being too complicated for the actual performance of ordinary music. The keyboard to be described in this paper is offered as one of the solutions of that problem. Before entering upon the details of its construction, it is necessary briefly to review the modern physical theory of harmony.

The principle of simple ratios, as it has been called, which has proved to be the key of theoretical harmony, was known in its application to the ancients, who determined the relative lengths of the parts of a stretched string sounding the different tones of the scale. But the explanation and the development of this principle could not possibly be made before the discovery of the wave



theory of sound. When once that theory has been accepted, it needs nothing more than inspection of diagrams to see that the waves produced by the sound-vibrations of two simple musical tones interfere less and reinforce each other more exactly in proportion to the simplicity of the ratio between their respective number of vibrations in a given time; and the investigation, partly physical and partly physiological, of the relations of the more complex musical tones and their effect upon the ear and the mind leads to the same general result, that the only case in which two tones can be simultaneously heard by the ear without mutual disturbance is when the vibration-numbers of those tones bear to each other certain very simple ratios. By the vibration number of a tone is meant the number of vibrations in a unit of time necessary to produce that tone.

The simplest ratios are of course those expressed by the smallest numbers. The simplest ratios from 1 to 2 are, therefore, in their order,

1, 2,  $\frac{3}{2}$ ,  $\frac{4}{3}$ ,  $\frac{5}{3}$ ,  $\frac{5}{4}$ ,  $\frac{7}{4}$ ,  $\frac{6}{5}$ ,  $\frac{7}{5}$ ,  $\frac{8}{5}$ ,  $\frac{7}{6}$ ,  $\frac{9}{8}$ ,  $\frac{8}{7}$ , etc.

These ratios do not include all possible, nor even all actual relations; but they embrace all the so-called consonant intervals and several of the so-called dissonant intervals. An attempt has been made to show that these intervals are pleasing exactly in proportion to the smallness of the numbers expressing the ratios. This theory has not been maintained, probably because of the working of some physiological principles together with the physical.

The relation 2:1 is the ratio between the vibration-number of any tone and that of its octave; and the problem of temperament is practically confined to the limits of an octave, because the key-board of any octave

in an instrument must be precisely similar in arrangement to that of every other octave of the same instrument.

In a paper read before the Essex Institute on the evening of the 3d of February last, a brief history of the development of the modern scale was given, which it is not necessary to repeat here, as the facts in relation to it are to be found in the works of Helmholtz, Sedley Taylor, and other writers on sound. It is enough to say here that the ordinary scale of harmony, the diatonic major scale, is now recognized as containing a series of tones whose vibration-numbers bear the following ratios to that of the lowest, beginning with the lowest itself :

$$1, \frac{9}{8}, \frac{5}{4}, \frac{4}{3}, \frac{3}{2}, \frac{5}{3}, \frac{15}{8}, 2.$$

It is to be remarked that a scale is merely a systematically arranged group of related tones, and there is no one scale which includes all related tones in common use. The diatonic major scale includes most of the simple relations of tones, and is therefore the most common in use. An analysis of this scale will show the simplicity of its composition.

In all harmony, some one tone is selected as a basis, to which all the other tones of the harmony are related. But when this tone, which is called the key-note, has been selected, there are in reality used as the base or foundation of harmonies made up from tones related to that key-note, three tones ; the key-note itself, one whose vibration number is  $\frac{3}{2}$  that of the key-note, and one to which the key-note itself bears the relation  $\frac{3}{2}$ , and which is therefore  $\frac{2}{3}$  of the key-note in its vibration number. The interval indicated by the ratio  $\frac{3}{2}$  is called a fifth, because it is fifth in order in the diatonic scale. In every key, then, there are used as the foundation of harmonies belonging to that key, the fifth above, which is called the dominant, the fifth below, called the subdominant, and

the key-note or tonic. Octaves of these tones are regarded in harmony as identical.

Every tone of the diatonic scale is related very simply to one of the three fundamental tones of its key, and is commonly sounded together with that fundamental tone. Remembering that the dominant is represented by  $\frac{3}{2}$  or its octave, and the subdominant by  $\frac{2}{3}$  or its octave, the scale may be thus analyzed :

1 = tonic.

$\frac{3}{2}$  =  $\frac{3}{2}$  dominant.

$\frac{5}{4}$  =  $\frac{5}{4}$  tonic.

$\frac{4}{3}$  = subdominant.

$\frac{3}{2}$  = dominant.

$\frac{5}{3}$  =  $\frac{5}{4}$  subdominant.

$\frac{15}{8}$  =  $\frac{5}{4}$  dominant.

2 = tonic.

The interval indicated by the ratio  $\frac{5}{4}$  is called a third, and it appears that the diatonic major scale is wholly made up of thirds and fifths. Prof. Poole has suggested that those tones of the scale deduced from fifths be indicated by Roman capital letters, and those deduced from thirds by Roman lower case letters. That is, the diatonic major scale may be written, in the key of C, for instance :

C	D	e	F	G	a	b	C
1	$\frac{3}{2}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{5}{3}$	$\frac{15}{8}$	2

Without carrying the development of the scale farther at this point, it is time to answer the question, What is the difficulty in constructing a key-board by which the simple diatonic scale may be justly intoned? Briefly put, the difficulty is this.

From the principle of related fundamental tones already referred to springs that of modulation, or the change

from one key-note to another. The natural interval of modulation is always a fifth. Now the fifth, the third, and the octave are incommensurable. To quote from Mr. Ellis' translation of Helmholtz's work: "It is impossible to form octaves by just 5ths or just 3ds or of both combined, or to form just 3ds by just 5ths, because it is impossible by multiplying any one of the numbers  $\frac{3}{2}$  or  $\frac{5}{4}$  by two, or either by itself or one by the other any number of times, to produce the same result as by multiplying any other of those numbers by itself any number of times."

Whenever, therefore, by successive modulations through fifths and transpositions through octaves we arrive at a key-note called by the same name as one of the tones of the diatonic scale deduced from thirds, it will not have the same number of vibrations as that tone. In other words, E, A, and B, the key-notes, are not identical with e, a, and b, the tones of the diatonic scale in C. The proportional difference between any key-note and the corresponding third denoted by the same letter is constant, depending upon what may be called the incommensurable element between  $\frac{3}{2}$ ,  $\frac{5}{4}$ , and 2. Suppose the vibration number of C to be 1, the vibration number of E, deduced by fifths and octaves, is

$$\frac{3}{2} \times \frac{3}{2} \times \frac{1}{2} \times \frac{3}{2} \times \frac{3}{2} \times \frac{1}{2} = \frac{81}{64};$$

the vibration number of e =  $\frac{1}{4} = \frac{80}{64}$ .

Since A bears the same relation to F which E bears to C, and a is the third of F,

$$A = \frac{81}{80} a, \text{ and similarly}$$

$$B = \frac{81}{80} b,$$

and in general the vibration number of any key-note is greater than that of the third denoted by the corresponding lower case letter by  $\frac{1}{80}$  of the latter. This difference is called the comma of Pythagoras.



Another complexity resulting from modulation is the introduction of new tones. Modulating into the key of G, the diatonic scale in that key is

G	A	b	C	D	e	f $\sharp$	G
$\frac{3}{2}$	$\frac{27}{16}$	$\frac{15}{8}$	2	$\frac{9}{4}$	$\frac{5}{2}$	$\frac{45}{16}$	$\frac{6}{2}$
1	$\frac{9}{8}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{5}{3}$	$\frac{15}{8}$	2

Here f $\sharp$  is a tone new to the diatonic scale in C. By successive modulations of fifths upward a key-note F $\sharp$  may be obtained, a comma greater than f $\sharp$ . Every successive modulation, then, necessitates an addition to the scale.

Another new series of tones is demanded by the nature of the relation between the three allied fundamental tones in any key. The dominant is so called because whenever chords are sounded based upon it, the ear demands a return to the tonic harmony; its sounding, as it were, commands the tonic to be sounded. Hence those tones in the dominant chord which most distinctly convey this impression of return to the tonic are most important, being most characteristic of the dominant harmony. It was long ago asserted theoretically and has since been confirmed by experiment that a tone whose vibration number bears a ratio of  $\frac{7}{4}$  to that of the dominant is a most important element of the dominant harmony. For instance, a tone so related to G, the dominant of C, when brought within the octave, would have a vibration number  $\frac{7}{16}$  of the tonic, which does not correspond with any tone of the diatonic scale. Prof. Poole has suggested that tones in this series should be designated by Gothic capitals. The interval is called the prime seventh, or dominant seventh, and the prime seventh of G would be **F**.

So far only the major mode of the diatonic scale has been referred to. There is another mode of using the tones of a scale to make harmonies, called the minor

mode, because the third, sixth, and seventh are smaller intervals than in the ordinary mode of the scale, the major.

For convenience, an arbitrary number of vibrations may be assumed for the tonic, and the other tones of the diatonic scale calculated accordingly. 48 is a convenient number for this purpose. The scale in C may be thus represented :

C	D	e	F	G	a	b	C
48	54	60	64	72	80	90	96

Suppose the scale to begin with the a below C :

a	b	C	D	e	F	G	a
40	45	48	54	60	64	72	80

These vibration numbers show the following ratios to the first :

$$1 \quad \frac{3}{2} \quad \frac{4}{3} \quad \frac{27}{20} \quad \frac{5}{4} \quad \frac{3}{2} \quad \frac{2}{1},$$

which are all simple except that belonging to D. If d the major third be used in this scale instead of D the key-note, there results a scale :

a	b	C	d	e	F	G	a
1	$\frac{9}{8}$	$\frac{6}{5}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{8}{5}$	$\frac{3}{2}$	2

This is the pure minor scale, differing from the major scale in the ratios of the third, sixth, and seventh. The minor scales commonly taught are combinations of major and minor intervals, especially by substituting the major for the minor seventh.

So far, no new tones are needed for harmonies in the minor mode, as a complete key-board for major harmonies supposes both thirds and key-notes in each letter. But the same principle of related chords applies to the minor mode as to the major ; if a is the tonic, e is the dominant and d the subdominant.

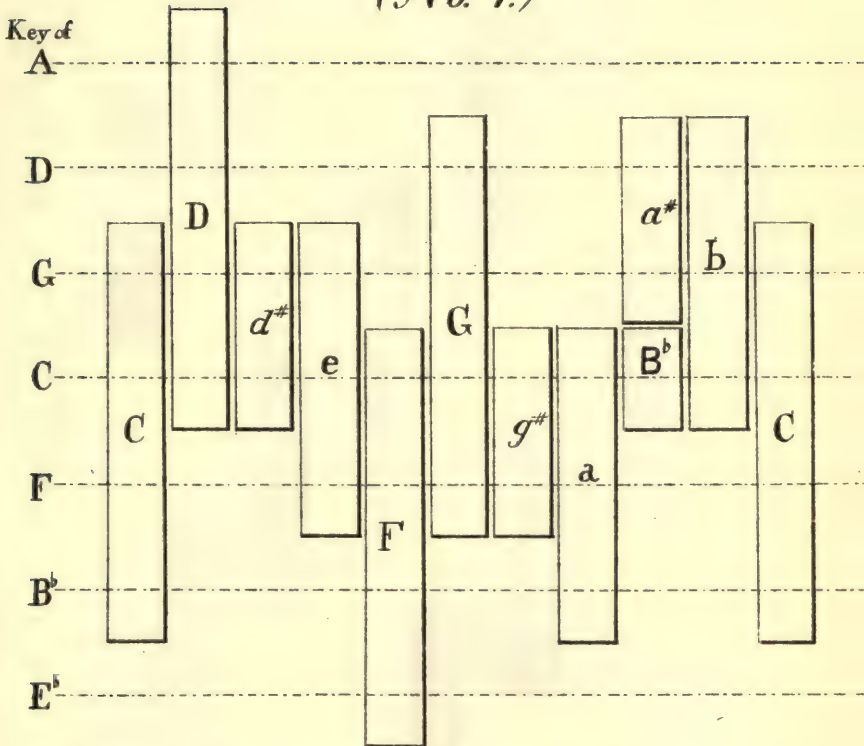
Prof. Poole's method of notation shows very clearly

the differences between the major and minor modes. It will be seen at a glance that in the major mode the tonic, second, fourth, and fifth are key-notes, the third, sixth, and seventh thirds. In the minor mode of the same scale the tonic, second, fourth, and fifth are thirds, the third, sixth, and seventh key-notes. Moreover, in the major mode, the tonic, dominant and subdominant are all key-notes; in the minor mode they are all thirds.

To return to the related harmonies of the minor mode, there is this peculiarity in the dominant harmony, that the third is not the minor, but the major, third. To play an instrument correctly in the minor mode, then, there must be a series of major thirds to thirds, which does not belong in the simple diatonic scale of harmony. For instance, in the scale of which *a* is the tonic, there must be a tone *g*<sup>#</sup> which is the major third of *e*, the dominant of *a*, and has the ratio  $\frac{15}{8}$  to *a*, with a vibration number 75 when that of *a* is 40. This *g*<sup>#</sup> might be regarded as the major seventh employed in the ordinary minor scale. Since every tone of the diatonic major scale deduced from thirds is in turn the dominant minor, there must be an additional tone for every tone of the diatonic scale deduced from thirds. This series Prof. Poole proposes to designate by an Italic lower case letter.

Digitals representing these four series of tones are essential to a complete key-board justly intoned. The word "digital" is used instead of the common word "key," as less liable to confusion with other terms. To be sure, the possible refinements of harmony do not stop here. In the dominant minor harmony, for instance, the prime seventh with the ratio  $\frac{7}{4}$  might be used instead of the minor seventh with the ratio  $\frac{9}{8}$ ; or it might be convenient to have a series of minor thirds from key-notes, for use in sudden changes from major to minor chords;

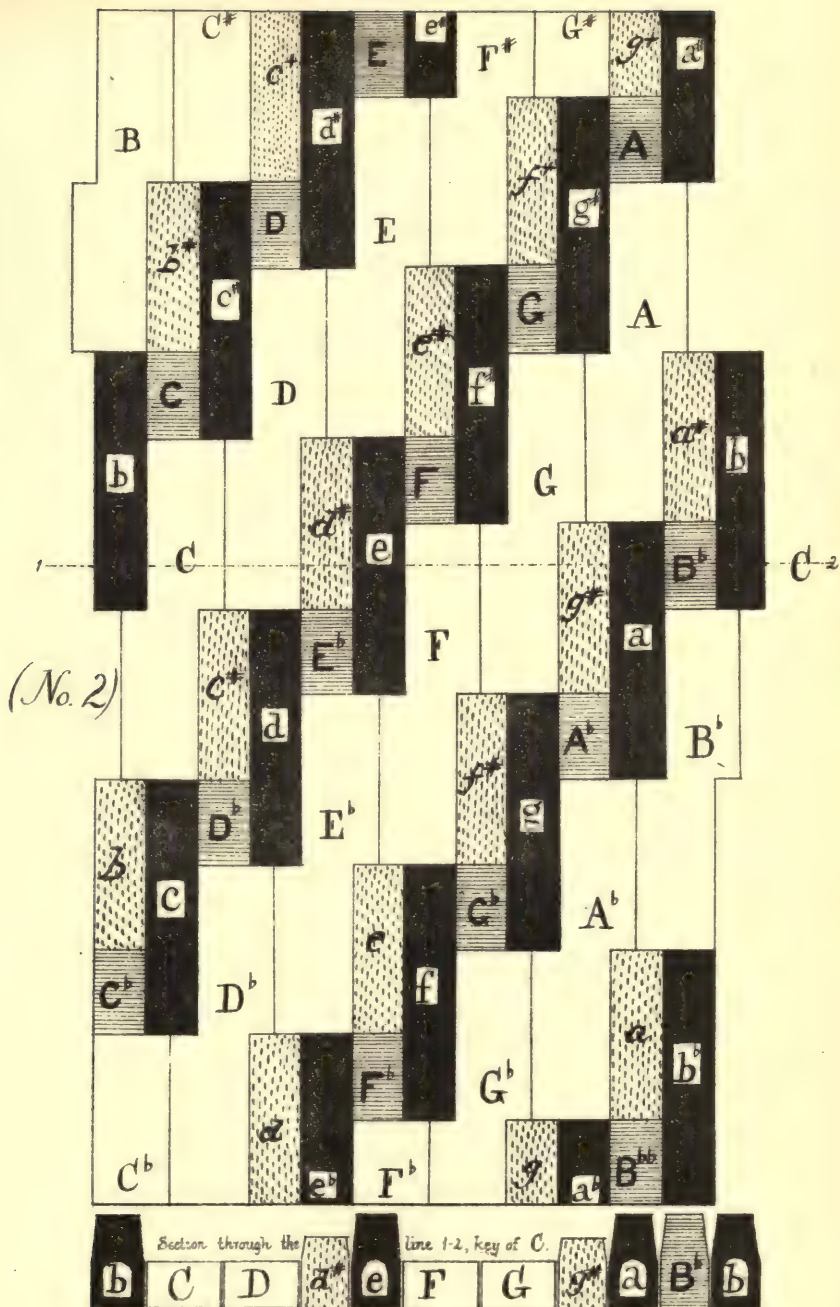
(No. 1.)



*Method of placing Digitals on Keyboard.*







ENHARMONIC KEYBOARD — ONE OCTAVE.



or there might be a series of prime elevenths or thirteenthths, the latter of which are sometimes heard in unaccompanied part-songs; but such possible refinements may for the present be very well dispensed with. If a key-board can be devised which shall contain these four principal series in perfect intonation, the problem will be practically settled. These series, to recapitulate, are as follows:

1. Key-notes, deduced from perfect fifths, denoted by a Roman capital, or in musical notation by a note of a red color, as suggested by Prof. Poole. On the key-board, a white digital may be used.

2. Major thirds from key-notes, denoted by a Roman lower case letter, or by a note of a yellow color, or a black digital.

3. Prime sevenths from key-notes, denoted by a Gothic capital, or by a note or digital of a blue color.

4. Major thirds from the tones of series 2, denoted by an Italic lower case letter, or by a note or digital of an orange color.

The distinctive colors, red, yellow, blue, and orange, were selected by Prof. Poole on account of an analogy between the relative number of vibrations producing those colors, and the relative number of vibrations producing the third, the fifth, etc. Black and white were adopted for the digitals because of the convenience of ebony and ivory as materials. The use of the colored notation in writing chords exhibits in a very curious and remarkable way the most important principles of harmony; but to the discussion of this very interesting subject the present paper cannot be extended. In order to have all these four series complete in all the keys from  $C_b$  to  $F\sharp$ , there are required sixty-two notes to the octave. The only method of bringing this great number of digitals within



the width determined upon for an octave, about six and one-half inches, and at the same time making them sufficiently large for practical use, is by extending the key-board in two directions. The method by which Prof. Poole has done this is as follows :

All modulations of key are made by progressing from front to back of the key-board as the modulations are upward, and from back to front for the reverse. All scales in the same key progress from left to right upward, as in the ordinary pianoforte.

The accompanying diagram (No. 1), giving the method of placing the digitals for the scale in the key of C, will explain the matter.

Dotted lines represent the horizontal lines of scales in the keys of E<sub>b</sub>, B<sub>b</sub>, F, C, G, D, and A.

There are in each octave of the diatonic major scale in any key :

(1.) Four key-notes, each related to four keys, including its own. Thus C is the second of B<sub>b</sub>, the fifth of F, the fourth of G, and the first or tonic of its own scale. It should therefore be found in the lines of those four keys. Similarly D is related to C, G, D, and A ; F to E<sub>b</sub>, B<sub>b</sub>, F, and C ; G to F, C, G, and D. These four key-notes, then, take the positions given them on the diagram.

(2.) Three major thirds from key-notes, each related to three keys. Thus b is the third of G, the sixth of D, and the seventh of C. Similarly, e is related to C, G, and F ; a to B<sub>b</sub>, F, and C. These three thirds, therefore, take the positions given them on the diagram.

(3.) One prime seventh related to one key-note and to be found only in the line of that key-note.

(4.) Three tones of series 4, each bearing the ratio  $\frac{4}{3}$  to a tone of series 2. Since for every tone of series 2

there is another of the same series bearing to it the ratio  $\frac{4}{3}$ , each tone of series 4 will bear to some tone of series 2 the ratio  $\frac{1}{2}$ , and will therefore serve as a leading note in melody to the latter tone of series 2; and it is more convenient to consider each tone of series 4 as connected with that tone of series 2 to which it bears the ratio  $\frac{1}{2}$ . For instance,  $g\sharp$  is the major third of  $e$ ; it is also the leading note of  $a$ , and is considered as connected with  $a$ .

Each digital of the fourth series is therefore placed immediately before that of the second series to which it has the relation  $\frac{1}{2}$ . As the lower third of the length of each digital of the second series is immediately preceded by a prime seventh, it saves space to extend the digitals of the fourth series only to two-thirds of the length of those of the second series. The digitals of the fourth series, then, are disposed as in the diagram.

The relative width of the various digitals is to some degree a matter of convenience, but that adopted by Prof. Poole has some practical advantages which will appear when we consider the completed key-board.

There are in the horizontal line of any key ten digitals; four of series 1, three of series 2, one of series 3, and two of series 4. The octave is divided into twenty-four spaces, and of these, three are given to each key-note and two to each of the other digitals. It has been found most convenient to elevate the digitals of the second and third series half an inch above those of the first, and to elevate those of the fourth series one-fourth of an inch above those of the first. All the digitals of each series are in the same plane, but the whole key-board is inclined slightly upward towards the back. Accompanying are a plan and section of an octave of the full key-board. This diagram gives all keys perfect from  $C_b$  to  $F\sharp$ . Blue

is represented by horizontal hatching, orange by a dotted surface, black and white by their own colors.

The symmetrical arrangement of this key-board is perceptible at a glance. Among the most important characteristics of its arrangement are the following :

All the digitals in any key in either the major or minor mode are to be found in the same horizontal line, drawn through the second quarter, downward, of the key-note, except the fourth of the minor mode, which is only one space below such a line.

The digitals in any key are arranged precisely the same as in every other key, so that the fingering is the same for all keys.

In modulation in the regular progression by fifths, the horizontal line of the new key is always only one space up or down.

All four of the notes of the different series represented by different forms of the same letter, as *e*, *e*, *E*, and **E**, are in the same vertical line.

In this key-board, there need be no temperament or approximation, but provision is made for just intonation in every key used. If, however, it should be thought desirable, for the sake of economizing space or expense, to reduce the number of strings or resonators, a considerable saving may be made by an almost inappreciable temperament, which the construction of the key-board renders very easy.

Suppose that C makes 256 vibrations in a second ; a number not exactly corresponding with the normal pitch, but convenient because a better multiple. Then tuning downward by fifths seven times,

$$C_b = 479\frac{103}{187}.$$

Tuning upward, G = 384 and b = 480.

$C_b$  is therefore less than b by  $\frac{1184}{2187}$  of a vibration in

480, or by less than  $\frac{1}{11}$  of a comma. If this error be imagined to be divided up into eight equal parts in tuning the successive fifths the amount of temperament in one fifth would be about  $\frac{1}{80}$  of a comma. This is far within the limits within which vibrations are said to *draw* into harmony. As a matter of practical tuning it is not to be taken into account at all. The best tuner would be as likely to come out with his  $C_b$  a little sharp of  $b$  as a little flat. This equalization is very useful because it gives the tuner a check by which to test the correctness of his key-notes both up and down. For if  $C_b = b$ , then by similar reasoning,  $D_b = c\sharp$ ,  $E_b = d\sharp$ ,  $F = e\sharp$ ,  $F_b = e$ ,  $G_b = f\sharp$ ,  $A_b = g\sharp$ ,  $B_b = a\sharp$ ; which gives a test for the key-notes  $C_b$ ,  $D_b$ , etc., and also saves the strings or resonators for  $b$ ,  $c\sharp$ , etc., as they may be made to sound the same strings or resonators as  $C_b$ ,  $D_b$ , etc.

Again, since  $D_b = c\sharp$ , and  $c = \frac{1}{12} D_b$ , and  $b\sharp = \frac{1}{12} c\sharp$ , then  $c = b\sharp$ ,  $d = c\sharp$ ,  $e_b = d\sharp$ ,  $f = e\sharp$ ,  $g = f\sharp$ ,  $a = g\sharp$ ,  $a_b = g\sharp$ ,  $b_b = a\sharp$ ; thus saving extra sound producers for eight tones of series 4 in every octave.

By this practically inappreciable temperament the number of sound producers is reduced to forty-six in the octave.

The method of tuning the key-board is first to tune the key-notes by fifths; then a major third from each key-note, and a major third from each of the last-named series. The prime sevenths, though not familiar to most tuners, are very easily tuned, especially when the third is sounded with its tonic.

There have been other key-boards invented with the same purpose as Prof. Poole's, and it is proper to say a few words in regard to his labors in the cause of just intonation.

In an article published in the "American Journal of



Science and Arts," Vol. 9, in 1850, Prof. Poole enounced 'A theory of perfect intonation in music, with a description of an organ made to obtain this result which had just then been completed.' The organ was provided with pedals and mechanism by which the larger number of pipes necessary for perfect tuning could be played by the common key-board.

In that article it was maintained that 'the prime seventh with the ratio 4 : 7 was harmonious, admissible, and used in music,' although this so far as he had seen was asserted for the first time. The Jahrbuch of Liebig and Kopp, in a discriminating review of Prof. Poole's article, specified this declaration.

In the same journal for July, 1867, Prof. Poole published an article on "Perfect Harmony in Music," containing a description of a new "Enharmonic key-board," which was substantially the same as that of which a drawing is given in this paper, though some improvements and simplifications have since been made in its details.

In the same journal for May, 1878, an article by Prof. Poole appeared on "Just intonation in music."

The necessity of just intonation for instruction in harmony and vocalization is now fully recognized, and it is to be hoped that those interested in the progress of musical science will interest themselves in the manufacture and introduction of these perfected instruments.

## MONDAY, APRIL 7, 1879.

MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Mr. JOHN ROBINSON presented in the name of Mrs. Samuel Johnson, President of the Salem Female Employment Society (lately dissolved), the records, work and account books of the Society.

Mr. Robinson read a paper prepared by Mrs. Johnson, giving a historical sketch of said society, its formation, its objects and its work, and what it has accomplished.

The paper was referred to the committee on publications, and a vote of thanks was passed to Mrs. Johnson for the papers, records and account books of the Society and the written statement of its doings.

The time of the arrival and the habits of some of the early spring birds were discussed by Messrs. William G. Barton, Fielder Israel, John Robinson, Caleb Cooke and others.

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## THURSDAY, APRIL 24, 1879.

At a meeting of the Institute this afternoon, adjourned from Monday, the 21st inst., Messrs. T. F. Hunt, Fielder Israel and Daniel B. Hagar were appointed on the committee to report a list of candidates for the various officers and committees to be elected at the annual meeting.

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## MONDAY, MAY 5, 1879.

At the meeting this evening Mrs. Daniel C. Manning was elected a resident member.

MONDAY, MAY 19, 1879.

ANNUAL MEETING this evening. The PRESIDENT in the chair. Records read. The annual reports of the Secretary, Treasurer, Librarian, Curators and Standing Committees were read and accepted, and from them the accompanying

#### RETROSPECT OF THE YEAR

has been compiled, presenting the work of the Institute, in the various departments, since the last annual meeting.

MEMBERS.—Changes occur in the list of associates by the addition of new names, and the withdrawel of some by resignation, removal from the county or vicinity, or by death. Twelve resident members have died, and we have received information that five of our correspondents have passed away in a serene old age.

*Gurdon Saltonstall*, son of Henry and Georgiana C. (Silsbee) Saltonstall, formerly of Salem, born Aug. 15, 1856; died at Pau, France, May 21, 1878.

*Daniel F. Staten*, the well known gas-fitter and plumber of Salem, died at his residence in Beverly Aug. 3, 1878, aged 41 years, 6 months, and 24 days.

*Joseph Gilbert Waters*, son of Capt. Joseph and Mrs. Mary (Dean) Waters of Salem, where he was born July 5, 1796; a Judge of the Salem Police Court for nearly forty years; died July 12, 1878.

*George Perkins*, son of Aaron and Susan (Wardwell) Perkins, for many years book-keeper in Mercantile National Bank of Salem, died Dec. 9, 1878, aged 40 years, 4 months, and 28 days.

*William B. Parker*, son of William B. and Abigail

(Watson) Parker, merchant of Salem, died Dec. 24, 1878, aged 77 years, 9 months and 7 days.

*Adelaide Martha (Edmands) Putnam*, daughter of William Murray and Martha Adams (Tapley) Edmands of Charlestown, died in Cambridge March 10, 1879, aged 40 years.

*David Roberts*, son of Samuel and Martha (Stone) Roberts, born in Hamilton April 5, 1804, lawyer in Salem and ex-mayor of the city; died March 19, 1879.

*James Hill*, for the past twenty-five years town clerk of Beverly, died March 24, 1879, aged 62 years.

*Ephraim Brown*, son of Ephraim and Rachel (Buffum) Brown, Register of Deeds for Essex many years, died March 30, 1879, aged 59 years, 8 months and 16 days.

*James Upton*, merchant of Salem, son of Robert and Lucy (Doyle) Upton, died March 30, 1879, aged 66 years.

*Andrew J. Thompson*, son of Levi B. and Mehitabel (Brown) Thompson, physician in Salem, born at Guilford, N. H., July 23, 1833; died April 26, 1879.

*Henry J. Cross*, City Treasurer of Salem, son of Parker and Mary R. (Clark) Cross, born in Marblehead, died May 15, 1879, aged 55 years, 10 months.

*Joseph Henry*, Secretary of the Smithsonian Institution, Washington City, and for over half a century one of the foremost men of Science in the United States; born at Albany, Dec. 17, 1797; d. at Washington, May 13, 1878.

*John Wingate Thornton*, a member of the Suffolk Bar, and an historical writer of wide reputation, died at Oak Hill, Me., June 6, 1878; son of James B. and Elizabeth (Gookin) Thornton; born at Saco, Me., Aug. 12, 1818.

*Richard Manning Hodges*, son of Gamaliel and Sarah (Williams) Hodges; born at Salem, Aug. 5, 1794; minister of Bridgewater, 1821-33; removed to Cambridge, 1834, where he resided until his death, Aug. 10, 1878.



*Nehemiah Adams*, son of Nehemiah Adams of Salem, born at Salem, Feb. 19, 1806 ; for forty-four years pastor of the Union Church, Boston ; died Oct. 6, 1878.

*E. R. Beadle*, a prominent Presbyterian pastor and scientist in Philadelphia ; died Jan. 19, 1879.

MEETINGS.—During the summer four *Field Meetings* have been held within the limits of this county. *First*, at the Centennial Grove, Essex, on June 24th, 1878. Messrs. J. H. Emerton, J. H. Huntington, John Robinson, C. C. Beaman, and E. S. Parker took part in the exercises of the occasion. *Second*, at Juniper Point, Salem, on July 10th. The morning was spent along the Salem and Beverly shores and in visiting the zoological laboratory of Mr. Emerton, and at the afternoon session the President and Mr. G. D. Phippen spoke of the historical associations of the place, and Messrs. J. H. Emerton and J. S. Kingsley of some of the forms of the lower orders of marine animal life. *Third*, at West Newbury. The party took the cars of the E. R. R. to Newburyport, thence by carriages to the place of meeting. During the ride a pleasant call was made at the hospitable mansion of Major B. Perley Poore, where an opportunity was afforded to examine his very extensive and fine collection of antique relics and other memorials of the olden times. At the afternoon session Mr. Haydn Brown of West Newbury gave an interesting sketch of the introduction of the manufacture of combs in that town, and Messrs. James Parson, J. H. Emerton, Luther Dame, Michael A. Dougherty, and Horace Brown were the speakers. *Fourth*, at Ipswich, October 4th. Plum Island was visited during the morning, and at the afternoon session the President and Messrs. I. J. Osbun, Charles Derby, and others were the speakers.

*Regular Meetings*, twenty-five, usually on the first and third Monday evenings of each month. The following communications received and lectures delivered may be specified:—"Notes on Pacific Coast Crustacea," by W. N. Lockington; "List of the Birds of the Hudson Highlands, with annotations," by Edgar A. Mearns; "An Account of the Flora of the Sandwich Islands," by Charles Derby; "Remarks on the Subject of Heredity," by Alpheus Hyatt; "A Catalogue of the Fishes of Essex County, Massachusetts, including the Fauna of Massachusetts Bay," by G. Brown Goode and Tarleton H. Bean; "Ornithological Explorations of the Lesser Antilles," by Frederick A. Ober; "Notes on the native and extensively introduced woody plants of Essex County, Mass.," by John Robinson; "The artificial hatching of Cod Fish," by J. H. Emerton; "Halibut fishing on the banks of Newfoundland," by Raymond L. Newcomb; "On Perfect Harmony in Music," by Theodore M. Osborne; "On the old merchants of Salem," by N. Silsbee.

LECTURES AND CONCERTS.—A course of eight lectures under the direction of the Lecture Committee were as follows: 1st, Monday, Oct. 28, by Samuel Johnson of North Andover, "On Florence." 2d, Monday, Nov. 11, 1878, by S. G. W. Benjamin of New York, "Sculpture." 3d, Monday, Dec. 9, by G. L. Vose of Bowdoin College, "The Light-house System of the United States." 4th, Monday, Dec. 23, by W. R. Ware of Boston, "Architecture." 5th, Monday, Jan. 27, by Winslow Upton of Salem, "The Solar Eclipse of 1878." 6th, Monday, Feb. 17, by J. W. Symonds of Portland, Me., "Nathaniel Hawthorne;" 7th, Monday, March 10, by I. J. Osbun of Salem, "The Electric Light." 8th, Monday, March 24, by W. W. Thomas of Portland, "A Ramble in Norway."

A course of free scientific lectures (eight in number) during the months of January and February, usually on Tuesday afternoons : two "On Plant Life," by Mr. John Robinson of Salem ; two "On the Simplest Animals," by Mr. James H. Emerton of Salem ; two "On the Human Body," by Charles S. Minot of Boston ; two "On Heat," by N. D. C. Hodges of Salem. These lectures were free to those persons who made personal application for tickets, and were delivered under the auspices of the Institute and Peabody Academy of Science.

The following, in addition to the lectures above mentioned, have been delivered in the rooms of the Institute : Tuesday afternoon and evening, May 22, lectures by Rev. E. C. Bolles of this city, "On the Phonograph," and an exhibition of the same ; Monday, May 27, lecture by Capt. E. A. Pitman, jr., of Marblehead, "On the Marshall Islands ;" Friday, Oct. 25, first of a series of eight lectures by Luigi Monti, continued on successive Friday evenings, "On the principal men who contributed to the Independence of Italy ;" Friday, Dec. 13, lecture by Luigi Monti, "On German and Italian Music ;" Wednesday, Feb. 12, Lecture by Rev. W. C. Wood "On Socrates ;" Friday, Feb. 14, illustrated lecture, "New York to Venice," by Gen. M. Y. Agramonti ;" Wednesday, Feb. 19, lecture by Rev. W. C. Wood, "Joan of Arc ;" Friday, Feb. 21, and the five following Fridays, Shakspeare readings, by George Riddle ; Wednesday, Feb. 26, lecture by Rev. W. C. Wood, "The North American Indians ;" Wednesday, March 19, lecture by A. Young, "The Comic and Tragic Aspects of Life ;" Friday, April 4, miscellaneous readings by George Riddle.

Under the personal direction of the Secretary five concerts have been given, with much credit to the society as musical performances. 1st, Monday, Nov. 25, by Mrs.

Julia H. West and others ; 2d, Monday, Dec. 30, Cecilia Quartette, Miss Abbie Whinery, Mrs. J. W. Weston, Mrs. H. E. Sawyer, Mrs. Jennie Noyes, J. W. Preston, pianist. 3d, Monday, Jan. 13, by B. J. Lang, Wulf Fries, and C. N. Allen. 4th, Monday, Jan. 27, by Salem Schubert Club. 5th, Monday, Feb. 10, by William S. Fenollosa, Miss Clara Emilio, Mrs. C. H. Fowler, and others.

EXCURSIONS.—Three very pleasant excursions, under the direction of the Secretary, have been made during the past season. 1st, to Newport, R. I., visited the Redwood Library, the Torpedo station at Goat Island, and other objects of interest in this old historic town, now a well known sea-side resort. 2d, Monday, July 22, to Montreal and Quebec via Plymouth, N. H., and Lake Memphremagog ; returned the following Saturday. 3d, Tuesday, Sept. 3, to the White Mountains, via Concord, Centre Harbor, and Plymouth, thence by stage up the valley of the Pemigewasset to the Profile House, thence to the Fabyan, where a meeting was held. Prof. J. H. Huntington, who had spent a winter on Mount Washington connected with the U. S. Signal Station, gave a graphic description of the duties of this service, and Mr. George D. Phippen spoke of the flora of the mountains. Returned on Saturday by way of Conway, Portsmouth, and Newburyport.

MUSEUM.—The specimens of Natural History, including those in Ethnology and Archæology, which have been given during the year, are on deposit with the trustees of the Peabody Academy of Science, in accordance with previous arrangements. These have been reported at our meetings, and have been duly acknowledged. The



following may be specified: from J. L. Story, Eben Stanwood, and Alburn Andrews of Essex, Prof. J. H. Huntington, Dr. S. A. Green of Boston, Miss Caroline Follansbee, Henry Wheatland, George D. Putnam, Miss Caroline R. Derby, F. Hubon, W. F. Nichols, E. S. Atwood, Miss Ravel. In addition to the above several interesting specimens of an historical character have been arranged in the rooms, received from the estate of Wm. Wallis, Miss I. G. Whipple, C. T. Brooks of Newport, R. I., T. F. Hunt, Mrs. M. G. Farmer of Newport, A. G. Browne, W. Savory, F. Israel, W. H. Richardson, James Kimball, G. E. Wiggin of Peabody, Moses S. Prime, George B. Foster, J. Henry Stickney of Baltimore, John T. Clark of Boston, E. P. Spencer, G. B. Loring, Salem Mercantile National Bank, Miss Sarah Swan, James A. Emmerton, N. A. Horton, William Fabens of Marblehead, Henry M. Batchelder, David Pulsifer of Boston, John Robinson, Henry M. Brooks, Miss M. E. Briggs, Charles T. Perkins. Several portraits have been added to the series: one of Daniel Webster by Mrs. Anna C. Warren of Boston, one of Mrs. Lois Orne by Mrs. Susan B. Cabot, one of A. L. Forestier by Miss Ellen G. Derby of Boston, one of Alfred Poore by himself, portraits of Mr. and Mrs. Timothy Fitch, painted by Copley, and of Mr. and Mrs. E. H. Derby, painted by Charles Osgood, from Miss Caroline R. Derby.

HORTICULTURAL EXHIBITION, at the rooms of the Institute, the past autumn, opened on Tuesday evening, Sept. 10, and closed on the following Friday. There was a fine display of fruit, flowers, pot plants and some vegetables. Mr. John Robinson exhibited a good collection of ferns and succulent plants, including many rare and interesting varieties; Mr. G. W. Creesy many pot plants,

showing the different varieties of coleus; Mr. J. W. Manning, of the Reading nurseries, fine specimens of hardy pines, junipers, arbor vitæ, etc.; Messrs. A. H. Dunlap and Son, seed dealers in Nashua, N. H., an elegant display of annuals; Charles A. Putnam, a stand of very fine seedling gladiolus. There was also a fine show of flowers and bouquets from other persons.

The display of fruit was very good. Mr. Charles A. Ropes of Salem had the largest collection, showing sixty-eight varieties; Hon. Haydn Brown of West Newbury a fine show of apples; G. D. Walton of Peabody, C. M. Richardson, Joseph A. Goldthwaite, George Baker, William Mack, and others were contributors.

This exhibition was under the supervision of Mr. H. W. Putnam, the curator of the department.

**LANDING OF JOHN ENDICOTT.**—The Fifth Half-century of the Landing of John Endicott was commemorated on the 18th day of last September. The commemorative exercises have been printed in full in the *HISTORICAL COLLECTIONS* of the Institute. The oration by Hon. W. C. Endicott, poems by Rev. C. T. Brooks and W. W. Story, all born in Salem and educated in her schools. Gov. A. H. Rice, Hon. R. C. Winthrop, Hon. Marshall P. Wilder, Dean Stanley, and other distinguished men were the guests of the society and took part in the post prandial exercises of the day.

**PUBLICATIONS** have been issued as heretofore,—the *BULLETIN*, vol. 10, and the *HISTORICAL COLLECTIONS*, vol. xv, have been published and distributed. The exchange list with few exceptions continues the same as last year.

LIBRARY.—The additions to the Library for the year May, 1878—May, 1879, have been as follows:—

<i>By Donation.</i>	
Folios, . . . . .	6
Quartos, . . . . .	25
Octavos, . . . . .	313
Duodecimos, . . . . .	83
Sexdecimos, . . . . .	21
Total of bound volumes, . . . . .	448
Pamphlets and Serials, . . . . .	2,488
Total of Donations, . . . . .	2,936

<i>By Exchange.</i>	
Quartos, . . . . .	5
Octavos, . . . . .	89
Duodecimos, . . . . .	3
Total of bound volumes, . . . . .	97
Pamphlets and Serials, . . . . .	1,237
Total of Exchanges, . . . . .	1,334

<i>By Purchase.</i>	
Octavos, . . . . .	6
Duodecimos, . . . . .	2
Sexdecimos, . . . . .	13
Total of Purchases, . . . . .	21
Total of Donations, . . . . .	2,936
Total of Exchanges, . . . . .	1,334
Total by Purchase, . . . . .	21
Total of Additions, . . . . .	4,291

Of the total number of pamphlets and serials, 1,664 were pamphlets, and 2,061 were serials.

The donations to the Library for the year have been received from one hundred and thirty-nine individuals and twenty-two societies and departments of the General and State Governments.

The exchanges from three individuals, one hundred and thirty-one societies and incorporate institutions, of which seventy-seven are foreign; also from editors and publishers.

Donations or exchanges have been received from the following:—

	Vols.	Pam.
Ainsworth, Mrs. C. C., . . . . .		30
Allen, Miss Marian, . . . . .	26	
Alnwick, Eng. Berwickshire Naturalists' Club, . . . . .		1
American Association Advancement of Science, . . . . .	1	
Amsterdam, Koninklijk Zoologisch Genootschap, "Natura Artis Magistra," . . . . .		1
Anagnos, M., Boston, Mass., . . . . .		1
Andrews, Mrs. Ruth, . . . . .		2
Arms, George A., Greenfield, Mass., . . . . .	1	
Atwood, Rev. E. S., . . . . .		1
Baldwin, Miss Caroline, . . . . .	2	
Baltimore, Maryland Historical Society, . . . . .		2
Baltimore, Md., Peabody Institute, . . . . .		1
Bamberg, Naturforschende Gesellschaft, . . . . .		1
Bancroft, C. F. P., Andover, Mass., . . . . .		7
Barton, J. W., . . . . .	17	
Barton, William G., . . . . .		8
Batavia, Natuurkundige in Nederlandsch India, . . . . .		1
Bemis, Luke, West Chester, Penn., . . . . .		68
Berlin, Gesellschaft Naturforschender Freunde, . . . . .		1
Berlin, Zeitschrift für die gesammten Naturwissenschaften, . . . . .	1	
Bern, Naturforschende Gesellschaft, . . . . .		1
Boardman, Samuel L., Augusta, Me., . . . . .	9	6
Bolles, Rev. E. C., Newspapers, . . . . .	7	107
Bologna, Reale Academia delle Scienze, . . . . .		1
Boothby, Josiah, London, Eng., . . . . .	1	
Bordeaux, Société Linnéenne, . . . . .		5
Boston, Amateur Scientific Society, . . . . .		9
Boston, American Academy of Arts and Sciences, . . . . .		2
Boston, Athenæum Library, . . . . .	1	
Boston, City of, . . . . .	3	
Boston, Appalachian Mountain Club, . . . . .		1
Boston, Massachusetts General Hospital, . . . . .		1
Boston, Massachusetts Historical Society, . . . . .	3	
Boston, Massachusetts Horticultural Society, . . . . .		4
Boston, Massachusetts Medical Society, . . . . .		1
Boston, New England Historic and Genealogical Society, . . . . .		5
Boston, Overseers of the Poor, . . . . .	1	
Boston, Public Library, . . . . .		8
Boston, Society of Natural History, . . . . .		18



	Vols.	Pam.
Braunschweig, Archiv der Anthropologie, . . . . .		2
Bremen, Naturwissenschaftlichen Verein, . . . . .		3
Brinley, Francis, Newport, R. I., . . . . .		1
Brock, R. A., Richmond, Va., . . . . . Newspapers.		6
Brown, Horace, . . . . .	2	
Bruxelles, Société Belge de Microscopie, . . . . .		11
Bruxelles, Société Entomologique, . . . . .		6
Buenos Aires, Sociedad Científica Argentina, . . . . .		5
Burch and Curtis, Canandaigua, N. Y., . . . . .	3	
Caen, Académie Royale des Sciences, Arts, et Belles-Lettres	1	
Cambridge, Harvard College Library, . . . . .		1
Cambridge, Museum of Comparative Zoology, . . . . .	2	7
Cambridge, Nuttall Ornithological Club, . . . . .		4
Canada Geological Survey, . . . . .	1	
Carpenter, Rev. C. C., South Peabody, Mass., . . . . .		3
Chemnitz, Naturwissenschaftliche Gesellschaft, . . . . .		1
Cherbourg, Société Impériale des Sciences Naturelles, . . . . .	1	
Chicago Historical Society, . . . . .	19	102
Chicago, University of, . . . . .		1
Cincinnati, Society of Natural History, . . . . .		3
Cobb, Charles H., Baltimore, Md., . . . . .	2	
Cogswell, William, . . . . .	1	1
Colby University, Waterville, Me., . . . . .		1
Cole, Miss Caroline J., . . . . .		1
Cole, Mrs. N. D., . . . . . Newspapers.	11	47
Contoocook, New Hampshire Antiquarian Society, . . . . .		6
Cooke, Caleb, . . . . .	1	1
Corey, D. P., Malden, Mass., . . . . .		1
Cram, George W., . . . . .	3	
Crosby, Mrs. M. K., . . . . .		34
Crosse et Fischer, . . . . .		3
Currier, W. H. B., Salisbury, Mass., . . . . .		1
Curwen, James B., . . . . .		23
Cutter, A., Charlestown, Mass., . . . . .		1
Danzig, Naturforschende Gesellschaft, . . . . .		1
Darmstadt, Verein für Erdkunde, . . . . .		1
De Costa, B. F., New York, N. Y., . . . . .		1
Derby, Charles, . . . . .	1	22
Dresden, Afrikanischen Gesellschaft, . . . . .		3
Dresden, Naturwissenschaftliche Gesellschaft "Isis," . . . . .		2
Dresden, Verein für Erdkunde, . . . . .		2
Dublin, Royal Irish Academy, . . . . .	2	22
Emdem, Naturforschende Gesellschaft, . . . . .		1

	Vols.	Pam.
Emery, Samuel, . . . . .	1	
Emmerton, James A., . . . . . Newspapers.		16
Erlangen, Physikalisch-medicinische Societät, . . . . .	1	
Falmouth, Eng., Royal Cornwall Polytechnic Society, . . . . .	1	
Farmer, Mrs. M. G., Newport, R. I., . . . . .	2	
Fielden, Frank A., . . . . .	26	1
Fiske, Mrs. J. H., . . . . . Newspapers.		123
Florence, Instituto di Studi Superiori, . . . . .	2	7
Fogg, Miss Ellen M., . . . . .	1	
Folger, W. C., Nantucket, Mass., . . . . .		10
Folsom, C. F., Boston, Mass., . . . . .	1	
Foote, Caleb, . . . . .	3	
Foote and Horton, . . . . . Newspapers.		
Foster, W. E., Providence, R. I., . . . . .	1	
Frankfurt, Zoologische Gesellschaft, . . . . .	9	
Freiburg, Naturforschende Gesellschaft, . . . . .	2	
Frothingham, Isaac H., Brooklyn, N. Y., . . . . .	1	
Galloupe, Isaac F., Lynn, Mass., . . . . .	8	2
Gates, Beman, Marietta, Ohio, . . . . .	1	
Genève, Société de Physique et d'Histoire Naturelle, . . . . .	2	
Giessen, Oberhessische Gesellschaft für Natur und Heil- künde, . . . . .		1
Goodell, A. C., Jr., . . . . .	36	101
Göttingen, Königliche Gesellschaft der Wissenschaften, . . . . .	1	
Gray, Horace, Boston, Mass., . . . . .		1
Green, S. A., Boston, Mass., . . . . .	4	124
Hamburg, Naturwissenschaftlicher Verein, . . . . .		2
Hannover, Naturhistorische Gesellschaft, . . . . .		2
Harlem, Bureau Scientifique Central Néerlandais, . . . . .		2
Hart, Charles H., Philadelphia, Penn., . . . . .	1	
Hartranft, John, Harrisburg, Penn., . . . . .	1	
Hassom, John T., Boston, Mass., . . . . .		4
Higbee, Charles H., . . . . .	2	
Hill, B. D., Peabody, Mass., . . . . .	1	
Hill, W. M., . . . . .		1
Hitchcock, Edward, Amherst, Mass., . . . . .		10
Hodges, Mrs. John, . . . . .		139
Hodges, N. D. C., . . . . .	1	19
Hoffman, Mrs. Eliza A., . . . . .	2	
Hoffman, W. J., Washington, D. C., . . . . .		2
Holmes, John C., Detroit, Mich., . . . . .	2	
Houghton, J. C., Lynn, Mass., . . . . .		1
Howell, E., Liverpool, Eng., . . . . .	1	

	Vols.	Pam.
Howgate, H. W., Washington, D. C., . . . . .		2
Hunt, T. F., . . . . .	21	43
Illinois State Board of Agriculture, . . . . .	1	1
India Geological Survey, . . . . .		6
Israel, Rev. Fielder, . . . . .	13	693
Jenison, O. A., Lansing, Mich., . . . . .	1	1
Jewett & Co., Boston, Mass., . . . . .	1	
Kidder, Frederic, Boston, Mass., . . . . .		1
Kimball, Edward P., Ipswich, Mass., . . . . .		1
Kimball, James, . . . . . Newspapers,	53	14
Kingsley, J. S., . . . . .		1
Kjöbenhavn, Kongelige Danske Videnskabernes Selskab, .		3
Kjöbenhavn, Société Royale des Antiquaires du Nord, .		2
Königsberg, Königliche Physikalisch-Ökonomische Gesell- schaft, . . . . .		3
Knox, John Jay, Washington, D. C., . . . . .		1
Lansing, Michigan Agricultural College Library, . . . .	1	
Lapham, W. P., Augusta, Me., . . . . .		1
Lausanne, Société Vaudoise des Sciences Naturelles, .		2
Lee, Francis H., . . . . .	1	11
Lee, Henry, Boston, Mass., . . . . .		1
Leeds, Philosophical and Literary Society, . . . . .		1
Leiden, Academia Lugduno-Batava, . . . . .	1	
Le Mans, Société d'Agriculture, Sciences et Arts de la Sarthe, . . . . .		4
Lisbonne, Academia Real das Sciencias, . . . . .	2	8
Liverpool, Literary and Philosophical Society, . . . .	2	
Long Island Historical Society, . . . . .		1
Loring, George B., . . . . .	1	
Lyon, Académie Impériale des Sciences, Belles-Lettres et Arts, . . . . .	2	
Lyon, Société d'Agriculture, d'Histoire Naturelle et des Arts Utiles, . . . . .	1	
Mack, Miss Esther C., . . . . .	4	
Mack, William, . . . . . Newspapers,	5	71
Madison, Wisconsin State Historical Society, . . . . .		1
Manning, Francis H., Boston, Mass., . . . . .	8	
Manning, Richard C., . . . . . Newspapers.		
Manning, Robert, . . . . . Newspapers,		10
Marsh, O. C., New Haven, Conn., . . . . .		2
Marshall, John W., Rockport, Mass., . . . . .		1
May, C. S., Danvers, Mass., . . . . .		1
Mexico, Museo Nacional, . . . . .		4

	Vols.	Pam.
Milwaukie, Wis. Academy of Science, Arts and Letters, . . . . .		1
Milwaukie, Wisconsin Naturhistorischen Verein, . . . . .		1
Minneapolis, Minnesota Historical Society, . . . . .		1
Missouri, State University Library, . . . . .	3	18
Montpeller, Vermont Historical Society, . . . . .	1	1
Morse, E. S., . . . . .		1
München, Königlich Bayerischen Akademie der Wissen- schaften, . . . . .		6
Napoli, Accademia delle Scienze Fisiche e Matematiche, . . . . .	4	
Nashville, Tenn., Fisk University, . . . . .		1
Neubrandenburg, Verein der Freunde der Naturgeschichte, . . . . .		1
Nevins, Winfield S., . . . . .	2	16
Newark, New Jersey Historical Society, . . . . .		2
New Haven, Connecticut Academy of Arts and Sciences, . . . . .		1
New Haven, Yale College Library, . . . . .		3
New York Academy of Science, . . . . .		4
New York American Geographical Society, . . . . .	2	3
New York Genealogical and Biographical Society, . . . . .		4
New York Historical Society, . . . . .	2	
New York Mercantile Library Association, . . . . .		1
New York Microscopical Society, . . . . .		1
Nichols, The Misses, . . . . .	9	2
Norfolk, John R., . . . . .		4
Nourse, Miss Dorcas C., . . . . .	2	3
Nurnberg, Naturhistorische Gesellschaft, . . . . .	1	
Oliver, Henry K., . . . . .		7
Oneida, Historical Society, . . . . .		3
Orange, N. J., N. E. Society, . . . . .		1
Osgood, Charles S., . . . . .		1
Otis, George A., Boston, Mass., . . . . .	8	7
Palfray, Charles W., . . . . .		85
Paris, Institut Historique, . . . . .		5
Paris, Société d'Acclimatation, . . . . .		18
Paris, Société d'Anthropologie, . . . . .		3
Peabody, Mass., Peabody Institute, . . . . .		1
Peirce, H. B., Boston, Mass., . . . . .	6	
Pennypacker, S. W., Philadelphia, . . . . .		1
Perkins, A. C., Exeter, N. H., . . . . .		3
Perkins, Henry, Philadelphia, . . . . .	1	19
Perley, Jonathan, . . . . .	2	
Pickering, Miss Mary O., . . . . .		29
Philadelphia, American Philosophical Society, . . . . .		2
Philadelphia, Library Company, . . . . .		2
Philadelphia, Pennsylvania Historical Society, . . . . .		4



	Vols.	Pam.
Ponsonby & Murphy, Dublin, Ireland, . . . . .	2	
Pool, Wellington, Wenham, Mass., . . . . .		2
Poole, W. F., Chicago, Ill., . . . . .		6
Poore, Alfred, . . . . .		2
Princeton, N. J., E. M. Museum of Geology and Archæology, . . . . .		1
Proutty, Phineas, Geneva, N. Y., . . . . .	1	
Providence, R. I., Nicholson File Co., . . . . .	1	
Providence, Rhode Island Historical Society, . . . . .		14
Pulsifer, R. M., Boston, Mass., . . . . .	1	
Putnam, Rev. A. P., Brooklyn, N. Y., . . . . .		1
Putnam, F. W., . . . . .		11
Putnam, H. W., . . . . .	6	20
Quebec, Literary and Historical Society, . . . . .	1	7
Quint, Rev. A. H., New Bedford, Mass., . . . . .		1
Rantoul, R. S., . . . . .		5
Regensburg, Zoologisch-Mineralogischer Verein, . . . . .		1
Reid, M. C., Hudson, Ohio, . . . . .		1
Riga, Naturforschender Verein, . . . . .	2	
Robinson, John, . . . . .	1	
Ropes, Miss S. P., Cincinnati, Ohio, . . . . .		2
Ropes, Rev. W. L., Andover, Mass., . . . . .		1
Salem, City of, . . . . .	1	
Salem, Essex Agricultural Society, . . . . .		1
Salem, Ladies' Centennial Committee, . . . . .	6	
Salem, Mercantile Bank, . . . . .	4	
San Francisco, California Academy of Science, . . . . .	1	1
San Francisco, Mercantile Library Association, . . . . .		1
Savannah, Georgia Historical Society, . . . . .	1	1
Secomb, D. F., Concord, N. H., . . . . .	1	17
S'Gravenhage, Nederlandsche Entomologische Vereeniging, . . . . .		2
Smith, Charles C., Boston, Mass., . . . . .		1
Smith, Miss Susan A., Pembroke, Mass., . . . . .		2
Spofford, A. R., Washington, D. C., . . . . .		1
Steiger, E., New York, N. Y., . . . . .	1	10
St. Gallen, St. Gallische Gessellschaft, . . . . .		1
Stilson, Arthur C., Ottumwa, Iowa, . . . . .		1
Stone, Benj. W., . . . . .	1	
Stone, Miss Mary H., . . . . .		7
Story, Miss E. A., . . . . .		2
St. Petersburg, Académie Impériale des Sciences, . . . . .		30
St. Petersburg, Imperial Botanical Garden, . . . . .		8
St. Petersburg, Société Entomologique de Russie, . . . . .	1	8
Sutton, W., . . . . .	6	
Sydney, Royal Society of New South Wales, . . . . .	2	3

	Vols.	Pam.
Tasmania, Government of, . . . . .	1	
Tasmania, Royal Society, . . . . .		1
Taunton Public Library, . . . . .		2
Taunton, Somersetshire Archæological and Natural History Society, . . . . .	1	
Taylor Bros., . . . . .		5
Thayer, Oliver, . . . . .	1	
Thornton, George, Boston, Mass., . . . . .	11	
Topeka, Kansas Academy of Science, . . . . .	1	
Topeka, Kansas Historical Society, . . . . .	19	13
Toronto, Canadian Institute, . . . . .		1
Troy Orphan Asylum, . . . . .		1
Tucker, Jonathan, Estate of the late, . . . . .	19	
Upham, Wm. P., . . . . .		76
Urbano, O., Central Ohio Scientific Association, . . . . .		1
U. S. Bureau of Education, . . . . .	1	1
U. S. Dept. of Interior, . . . . .	54	1
U. S. Engineer Dept., . . . . .	2	
U. S. Naval Observatory, . . . . .	6	1
U. S. Patent Office, . . . . .		60
U. S. Treasury Dept., . . . . .	1	
Virginia, Fish and Game Protective Association, . . . . .		1
Walcott, Chas. H., Concord, Mass., . . . . .		1
Walter, Joseph R., Wilmington, Del., . . . . . Newspapers,		1
Ward, Miss Julia, South Hadley, . . . . .		1
Ware, Tileston & Co., Boston, Mass., . . . . .		8
Washington, Smithsonian Institution, . . . . .	4	
Waters, Henry F., . . . . .		94
Waters, J. Linton, . . . . .		106
Wetenschappen, Bataviaasch Genootschap van Kunsten, . . . . .		4
Wien, K. K. Zoologisch-botanische Gesellschaft, . . . . .	1	
Wien, Verein zur Verbreitung Naturwissenschaftlicher Kenntnisse, . . . . .	1	
Wiesbaden, Verein für Naturkunde, . . . . .	2	
Wilder, M. P., Dorchester, Mass., . . . . .		1
Williams, James, Columbus, Ohio, . . . . .	1	
Willson, Rev. E. B., . . . . .		59
Wilmington, Delaware Historical Society, . . . . .		1
Winthrop, Robert C., Boston, Mass., . . . . .	1	2
Worcester, American Antiquarian Society, . . . . .		2
Worcester, Society of Antiquity, . . . . .		1
Würzburg, Physikalisch-medicinische Gesellschaft, . . . . .		2
Zurich, Naturforschende Gesellschaft, . . . . .		8

The following have been received from editors or publishers :—

American Bookseller.	Nation.
American Journal of Science and Arts.	Naturalists' Leisure Hour and Monthly Bulletin.
American Naturalist.	Nature.
Beverly, N. J., Banner.	Our Dumb Animals.
Boston Herald.	Peabody Press.
Canadian Naturalist.	Peabody Reporter.
Cape Ann Bulletin.	Quaritch's Catalogue.
Dexter Smith's Paper.	Sailor's Magazine and Seamen's Friend.
European Mail.	Salem Gazette.
Forest and Stream.	Salem Observer.
Francis' Catalogue.	Salem Post.
Gardener's Monthly.	Salem Register.
Gurney's Weekly.	The Librarian.
Hardwicke's Science Gossip.	Turner's Public Spirit.
Historical Magazine.	Vox Humana.
Lawrence American.	Zoologischer Anzeiger.
Lynn Reporter.	

FINANCIAL.—The Treasurer's Report exhibits a statement of the receipts and expenditures during the past year.

#### DEBITS.

##### *General Account.*

Salaries, \$1,855.68; Coal, \$105.00; Gas, \$94.41, . . . . .	\$2,055 09
Lectures and Concerts, \$639.86; Publications, \$1,328.58, . . .	1,968 44
Express and Postage, \$47.93; Insurance, \$40.00, . . . . .	87 93
Excursions and Field Meetings, \$5,464.42; Stationery, \$21.36, . . .	5,486 37
Endicott Celebration, \$1,034.00; Sundries, \$126.69, . . . . .	1,160 69
	<hr/>
	\$10,758 52
Balance in hands of Treasurer, . . . . .	254 76

##### *Historical.*

Books, \$9.28; Binding, \$75.00, . . . . .	84 28
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##### *Natural History and Horticulture.*

Exhibition, . . . . .	22 41
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##### *Ditmore Fund.*

F. J. Perkins, . . . . .	93 22
	<hr/>
	\$11,213 19

## CREDITS.

By Balance of 1878 accounts, . . . . . \$146 98

*General Account.*

Dividends Webster Bank, . . . . .	\$30 00	
Assessments, \$1,031.00; Publications, \$617.64, . . . . .	1,648 64	
Sundries, \$336.93; Life Membership, \$30.00, . . . . .	366 93	
Excursions, etc., \$5.926.08; Lectures and Concerts, \$793.79, . . . . .	6,719 87	
Subscriptions on Endicott Celebration, \$1,034.00, . . . . .	1,034 00	
Refunded Bank Tax, \$9.71; Salem Savings Bank, \$522.61, . . . . .	532 32	
		10,331 76

*Ladies' Fair Fund.*

Coupons City of Chicago Bonds, . . . . . 70 00

*Historical.*

Dividends Naumkeag National Bank, . . . . .	16 00	
Dividends Michigan Central R. R., . . . . .	20 00	
		36 00

*Natural History and Horticulture.*

Dividends P. S. & P. R. R., . . . . .	12 00	
Exhibition, . . . . .	36 45	
		48 45

*Davis Fund.*

Coupons Chicago, Burlington and Missouri R. R., . . . . .	140 00	
Coupon Dixon & Peoria R. R., . . . . .	240 00	
		380 00

*Ditmore Fund.*

Coupons Old Colony R. R., 7s, . . . . .	70 00	
Coupons Old Colony R. R., 6s, . . . . .	60 00	
Interest Five Cents Savings Bank, . . . . .	40 00	
		170 00

*Derby Fund.*

Rent of Land, . . . . .	30 00	
		\$11,213 19

Mr. John Robinson exhibited two fine specimens of the flowers of the *Phyllo-cactus crenatus* and gave an account of this and several allied species.

The committee on nominations reported the following list of officers for the year ensuing.

*Voted*, To proceed to the choice of officers and a nominating committee was appointed to receive, assort, and count the votes.

The following were elected:—



**PRESIDENT:**  
**HENRY WHEATLAND.**

**VICE-PRESIDENTS:**

ABNER C. GOODELL, JR.,	WILLIAM SUTTON,
FREDERICK W. PUTNAM,	DANIEL B. HAGAR.

<b>SECRETARY:</b>	<b>TREASURER:</b>
GEORGE M. WHIPPLE.	GEORGE D. PHIPPEN.

<b>AUDITOR:</b>	<b>LIBRARIAN:</b>
RICHARD C. MANNING.	WILLIAM P. UPHAM.

**CURATORS:**

<i>History</i> —JAMES KIMBALL. <i>Manuscripts</i> —WILLIAM P. UPHAM. <i>Archæology</i> —FREDERICK W. PUTNAM. <i>Numismatics</i> —MATTHEW A. STICKNEY. <i>Geology</i> —ISAAC J. OSBUN.	<i>Botany</i> —GEORGE D. PHIPPEN. <i>Zoology</i> —EDWARD S. MORSE. <i>Horticulture</i> —HENRY W. PUTNAM. <i>Music</i> —JOSHUA PHIPPEN, JR. <i>Painting &amp; Sculpture</i> —T. F. HUNT. <i>Technology</i> —EDWIN C. BOLLES.
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**COMMITTEES:**

*Finance:*

The PRESIDENT, *Chairman ex off.*

JAS. KIMBALL. JAS. O. SAFFORD. HENRY M. BROOKS. GEO. R. EMMERTON.  
The TREASURER, *ex off.*

*Library:*

CHARLES W. PALFRAY. GEORGE F. FLINT. HENRY F. KING.  
WILLIAM NEILSON. JAMES A. EMMERTON.  
The LIBRARIAN, *ex off.*

*Publication:*

EDWARD S. ATWOOD. ABNER C. GOODELL, JR. EDWIN C. BOLLES.  
JAMES KIMBALL. T. F. HUNT.

*Lecture:*

WILLIAM D. NORTHEAD. FREDERICK W. PUTNAM. AMOS H. JOHNSON.  
ARTHUR L. HUNTINGTON. FIELDER ISRAEL.

*Field Meeting:*

The SECRETARY, *Chairman ex off.*

GEORGE A. PERKINS, Salem.	GEORGE D. PHIPPEN, Salem.
GEORGE COGSWELL, Bradford.	LEWIS N. TAPPAN, Manchester.
FRANCIS H. APPLETON, Peabody.	JAMES H. EMMERTON, Salem.
NATHANIEL A. HORTON, Salem.	EBEN N. WALTON, Salem.

## MONDAY, JUNE 6, 1879.

REGULAR MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

The PRESIDENT referred to two valuable donations to the library since the last meeting. "The Whitney Genealogy" in three very handsome quarto volumes, and the "Chronological History of Plants," by Charles Pickering, both being works of more than ordinary interest, elegantly printed, and of great value as works of reference. The Whitney Genealogy is a fine specimen of book making as regards typography and binding. Five hundred were printed in quarto form and ten in folio, all for presentation. Mr. S. Whitney Phoenix, of New York city, is the compiler of the work, and donor.

*Voted*, That the thanks of the Institute be tendered to the donors of the above named works.



## FRIDAY, JUNE 20, 1879.

THE first Field Meeting this day at Ship Rock, South Peabody. The place for the rendezvous at Rockville chapel, under the charge of Rev. C. C. Carpenter.

In the forenoon, one party under the guidance of Mr. James H. Emerton visited Bartholomew's Pond, another party under the direction of Mr. John Brown, 2nd, went to Ship Rock, the stone quarries, and the adjacent points of interest. Lunch was served in the chapel at 1.30 P. M., and at 3 P. M. the afternoon session was held, the PRESIDENT in the chair. Records of preceding meeting read.

In opening the meeting the PRESIDENT spoke of former meetings held in this place, of Ship Rock, of the geological features of the vicinity, of the various persons, who, in times past had devoted much time to the study of the natural history of Peabody, alluded to the plan suggested by Mr. Wilson Flagg, of appropriating a tract of land about Bartholomew's Pond for a public park, the characteristic features of the place being admirably adapted for this purpose, contiguous to the cities of Salem and Lynn and the town of Peabody.

REV. GEORGE F. WRIGHT, of Andover, said that he had been always interested in the famous boulder, Ship Rock, and had been with the party who had visited it this day. He gave a very clear and interesting statement of the geological character of the region, and explained the action of ice and water during the glacial period, showing why Ship Rock had probably lodged in its present position, and stating other theories in regard to the ice period.

MR. JAMES H. EMERTON spoke of the flowers and plants that had been gathered during the morning's ramble, and the subject was continued by Dr. GEORGE A. PERKINS, of Salem.

REV. C. C. CARPENTER, of South Peabody, remarked on the historical and genealogical character of this neighborhood, speaking of the old families, the old houses, and the peculiarities of the people. Mr. Carpenter brought to the meeting some very interesting books and historical documents for the inspection of those present. Among them was a large quarto volume in Latin, entitled "Tractatus Morales de virtutibus," by William, Archbishop of

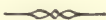
Lyons (1272), and printed in Cologne, 1479. The book is in black-letter, illuminated in red throughout, by hand.

Mr. SAMUEL BROWN, of Rockville, gave some account of the quarry business of the town and spoke of some of the old families alluded to by the previous speaker.

Rev. Messrs. ISRAEL and HOSMER, of Salem, remarked briefly on the pleasure and profit they had derived from the day, and of the good influence of such meetings.

On motion of Rev. F. Israel:—

*Resolved*, That the cordial thanks of the Essex Institute are tendered to Rev. C. C. Carpenter, Mr. John Brown, 2nd, and other gentlemen of South Peabody, for the use of Rockville chapel, and for their kind attentions and civilities, thereby adding much to the pleasure and interest of this meeting. Also to the officers of the Eastern Railroad for courtesies received.



FRIDAY, JUNE 27, 1879.

THE second Field Meeting of the season was held this day at Andover. The weather was fine, the party numbered over eighty, and left Salem by special train over the Eastern Railroad at 8.30 A. M., arriving at 10. The place of meeting was the Free Congregational Church, where the party was met by Rev. G. F. Wright and Rev. F. H. Johnson, and other persons interested in the meeting. A large portion of the party, under the direction of Mr. Wright, visited Indian Ridge. This moraine has been made an especial study by Mr. Wright, who has published several papers on the moraines of the county,



which are of much value to the student of geology, and the morning with him was most interesting. Prospect Hill, Sunset Rock, the Shausheen River, were also visited. The library room (Brecher Hall) and the flax mills were open to the visitors, and the fine collection of antiquities belonging to Rev. Selah Merrill, were seen by several of the party, the owner explaining the various specimens. Lunch at 1.30, and the afternoon session in the church at 3 P. M. PRESIDENT in the chair. Records read.

The PRESIDENT referred to former field meetings held in Andover and spoke of the objects of the Institute, especially to the forming of a collection of books and pamphlets of every description relating to the county, as written by natives and residents of the county.

Rev. GEORGE F. WRIGHT gave a full account of the Indian Ridge which had been visited during the morning. Mr. W. also referred to the ice period, and described the surface geology of the region about Andover.

Prof. WILLIAM H. NILES, continuing the subject, gave an account of observations made by himself among the glaciers of the Alps. He fully endorsed the theory advanced by Mr. Wright in regard to the Indian Ridge, and spoke in the highest terms of Mr. Wright's published paper on the ridge and the geology of the vicinity, illustrating his remarks by drawings on the blackboard.

Rev. FRANCIS H. JOHNSON, of Andover, placed on the table for exhibition, a very curious old powder-horn loaned for this occasion. Mr. Johnson read a statement regarding the horn which was given to one of the early Andover families by some Acadians who lived in the

town years ago. He also read a chapter from the forthcoming history of Andover by Miss Sarah L. Bailey, upon the early manufacture of gunpowder in Andover, and added to it a few valuable remarks of his own. It appears that the slow progress of Washington in the siege of Boston, a hundred years ago, was largely owing to a lack of powder; some being brought with ox teams from as far as Ticonderoga. The General Court of Mass. urged Judge Phillips (who was a member, and was also at the same time engaged in founding Phillips' Academy) to undertake the business of manufacturing powder for the army. They agreed to furnish him with sulphur and saltpetre, and he was to deliver powder at eight pence per pound. Mr. Phillips hastened home and set his neighbors to work erecting a building for the purpose, on the site (it is supposed) of the Marland Mills. Miss Bailey presents conclusive evidence that powder was manufactured at Andover, for use in the Revolutionary war, sometime before the Stoughton powder mill was available. In a short time more than a thousand pounds per week were turned out. But it appears also that some of the powder was not good. This is shown in a caustic letter of Gen. Washington, and from the action of the General Court in returning that of poor quality for remanufacture, and in sending a French expert to impart knowledge upon the subject to the Andover manufacturers.

Another interesting point brought out in Miss Bailey's accurate, racy, and painstaking history is, that when Mr. Chandler, the foreman of the powder mills was drafted for service in the army besieging Boston, Mr. Phillips successfully petitioned to have his help exempted from military service, on the ground that their places could not well be supplied, and that their occupation was already

one of extreme hazard, and of imperative necessity to the public service. The mill was blown up once with a loss of three lives. The state bore half the expense of rebuilding, and promised to do the same again in case of further accident.

Mr. Johnson read another short sketch, concerning the Acadian refugees (from whose history Longfellow drew the incidents of *Evangeline*), thirteen of whom were for some time in Andover under the care of Mr. Stephen Abbot's grandfather. The interesting powder-horn in his possession was afterwards sent to them as a memento of his kindness.

Mr. GOLDSMITH, of Andover, principal of the Punchard High School, described the various flowers found during the morning, and spoke of the general objects of the meeting. He proposed that a portion of Indian Ridge be reserved forever as a Public Park, and that the trees and natural growth be carefully preserved and guarded against the woodman's axe.

Mr. J. H. EMERTON, of Salem, described several insects brought to the table.

Rev. SELAH MERRILL, of Andover, spoke of his unique collection of antiques brought by him from Syria, and gave an account of the slab of cuneiform inscriptions in the Theological Library.

Mr. G. W. W. DOVE, of Andover, gave an account of the flax mills under his charge, and described the process of cultivating and the manufacture of flax and a brief historical sketch of the introduction of the manufacture in Andover.

Rev. E. S. ATWOOD, of Salem, spoke of the interest he felt in the work of the day, and said that the objects of the Institute were such as should commend the society to every person in the county. He referred to the curious and interesting specimens that he had examined in Mr. Merrill's house and advised all to visit the collection.

On motion of Mr. Atwood :—

*Resolved*, That the hearty thanks of the Essex Institute are hereby presented to Rev. Messrs. Wright and Johnson, and to Messrs. Dove, Goldsmith, and Prof. W. H. Niles and others, for their arduous and successful efforts in making and carrying out the arrangements for the Andover Meeting.



MONDAY, JULY 7, 1879.

REGULAR MEETING of the Society this evening. The PRESIDENT in the chair. Records read. Correspondence and donations announced.

C. A. Lawrence, of Beverly, and Rebecca Archer, of Salem, were elected members.

The PRESIDENT referred to the late JAMES UPTON, Esq., for many years an officer of the Institute, and one who largely promoted its objects and its usefulness. He introduced Rev. R. C. MILLS, D. D., a life-long friend and the pastor of the church that Mr. Upton attended, who read an appropriate memoir of the deceased, briefly sketching the genealogy of the family and speaking of his life and works; his connection with the Institute as a member and officer; his devotion to the church, of which he was a consistent member; his eminent business quali-



ties during a long and busy term of years as a merchant of Salem.

Dr. GEORGE A. PERKINS spoke of his intimate relations with Mr. Upton, and heartily endorsed the remarks of Mr. Mills. He moved that the communication be referred to the publication committee, with a request that the same be printed in the HISTORICAL COLLECTIONS of the Institute.

Mr. JAMES KIMBALL read a paper on the "Early Manufacture of Glass in Salem," claiming, in contradiction to certain published statements, that Essex County, and in part Salem, established the first glass factory and manufactured the first glass in New England. Referred to the Committee on Publications.



THURSDAY, JULY 31, 1879.

THIRD Field Meeting, the present season, near the asylum station, Danvers. The members from Salem left at 9.25, A. M., from the E. R. R. station, and were joined at the grounds by many others, who came in private carriages from various places. On arrival all repaired to Oak grove and deposited the baskets. Through the courtesy of Dr. Calvin S. May, the superintendent, the party visited many of the principal rooms of the asylum; afterwards, separating into small groups, went in pursuit of their respective specialities.

On the 25th of April, 1873, an act to establish a Hospital for the Insane in the northeastern part of the commonwealth was approved. A commission was appointed, who selected as a site this hill and the adjoining lands

known as Hathorne or Prospect Hill, belonging to Francis Dodge and others, containing 197.28 acres. Before grading the elevation was 257 feet above mean high tide, being the highest land in the vicinity. The land was purchased by the commonwealth and grading was commenced May 4, 1874. May 17, 1877, an act authorizing the appointment of Trustees for the State Lunatic Hospital, Danvers, was approved, and on the 25th of the following October the property was transferred to them by the commissioners.

The noon collation was spread in the grove. The afternoon session was held at 3, P. M., in Hathorne Hall, Asylum Building. The PRESIDENT in the chair. Records read, correspondence and donations announced.

The PRESIDENT, in his opening remarks, referred to this place as historic ground; many distinguished names being associated with the history of this vicinity. The name of this hall is suggestive of the fact that a large tract of land, including this elevation, was granted to Major William Hathorne at the beginning of the Colonial government, and was retained in his possession many years. He came over in the *Arabella* with Winthrop and settled in Salem in 1636 or the year following, having had tendered to him grants of land if he would remove hither. He was a very prominent man in the colony, holding important positions, commissioner, speaker of the House of Representatives, counsel in cases before the courts, judge on the bench, soldier commanding important and difficult expeditions, and in many other cases. He died in 1681. This name appears to have been as prominent in the civil history of that early period as it has been in the elegant literature of the present, by the writings

of a lineal descendant, in the sixth generation—Nathaniel Hawthorne.

Mr. ANDREW NICHOLS, of Danvers, was then called upon, who gave an extended notice of the ownership of this property, from the first grant to Major Hathorne, interspersed with some pleasing historical allusions, and said that the hill had passed through the hands of ten different owners. It remained in the Hathorne family for twenty-five years, in the Rea family for eighty years, in the Prince family for forty-four years, in the Dodge family for thirty-four years, leaving but fifty-four years for the other owners out of 237 years of ownership.

Dr. CALVIN S. MAY, the Superintendent of the Hospital, gave a description of the building, the method of heating and ventilation, spoke of the patients under his charge and the usual plan of the Institution, its management and its objects. The building was opened for the reception of patients May 13, 1878; 806 patients have been received since the opening, and at the present time there are 512 inmates for treatment.

Rev. L. M. LIVERMORE, of Danvers, spoke of the pleasure he had received in attending this meeting and alluded very pleasantly to the various plants collected during the forenoon ramble.

Mr. JAMES H. EMERTON gave a graphic description of the pitcher plant (*Sarracenia purpurea*), and the sun dew (*Drosera rotundifolia*), which were placed upon the table.

Dr. GEORGE A. PERKINS gave an account of a recent visit to the coal region of Pennsylvania, and exhibited

some fine specimens of fossil ferns and wood which he had collected.

Rev. W. E. C. WRIGHT, of Danvers, spoke of the interest in the objects of the meeting, and in his remarks on the geology of this region referred to the ice period and the glacial marks perceptible on the hills of Danvers and vicinity.

Rev. FIELDER ISRAEL, of Salem, said that he had been impressed during the progress of the meeting by the thought that the Essex Institute was holding an educational and a scientific meeting within the walls of an asylum, and that quite a number of the inmates were present and appeared to be interested in listening to the proceedings. In closing his remarks he offered the following resolution, which was unanimously adopted :—

*Resolved*, That the cordial thanks of the Essex Institute are hereby tendered to Mr. Andrew Nichols, to Dr. Calvin S. May, to Charles P. Preston, and other citizens of Danvers for the kind welcome given to the Institute, and the generous provision made for the accommodation of the meeting.



*A List of the Birds of the Hudson Highlands, with  
Annotations.*

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BY EDGAR A. MEARNS.

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[Continued from page 52.]

**31. *Dendroeca cœrulea*, (Wilson).** CÆRULEAN WARBLER. A rare migrant. "I secured a fine male of this beautiful species, near my residence, May 17, 1875."<sup>1</sup> Mr. H. G. Fowler records<sup>2</sup> a female taken in central New York, May 27, 1876.<sup>3</sup>

**32. *Dendroeca coronata*, (Linné).** YELLOW-RUMPED WARBLER. An excessively abundant spring and fall migrant, and occasional winter resident. Arrives near the middle of April (17, 1876), remaining till late in May (28, 1874; 23, 1875; 23, 1876; 20, 1877); in autumn it arrives late in September (28, 1875; 23, 1876), remaining till the first of December, or later, according to the severity of the weather. Throughout the winter of 1877-78 it remained in considerable numbers in the Highlands. It seemed quite contented so long as the ground was bare; but after a snow-storm flew restlessly about, seeking with great avidity any bare spot of ground. It was often observed flying about in orchards; but inhabited chiefly bushy places, and cedar groves near the Hudson. Its food consisted mainly of cedar berries. Its spring moult takes place about the first of April.

I give the following extract from my journal:

"April 25, 1878. While hunting in the rain, the clouds suddenly shone out bright—a purely April phenomenon—and then the birds began to sing. Even the Yellow-rumps produced a very pleasant warble, which, taken up by one after another of the flock by which I was surrounded, produced a very pleasing medley of music."

*Dimensions.*—Average measurements of twenty-four specimens:

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<sup>1</sup> Bull. Nutt. Orn. Club, Vol. III, p. 46, 1878.

<sup>2</sup> Complete List Birds Cayuga, Seneca, and Wayne counties, Daily Advertiser, Auburn, N. Y., Aug. 14, 1877.

<sup>3</sup> As this article is going through the press, I have received, through the kindness of Mr. S. F. Rathburn, his "Revised List of Birds of Central New York," where I find, in addition, the following: "Not an uncommon summer resident. Observed rarely previous to 1876. Arrives about the second week in May. Taken by Mr. E. R. Richardson, jr., of Auburn, N. Y., May 8th, 1878. Departs in September."

length, 5·65; stretch, 9·01; wing, 2·85; tail, 2·25; bill from nostril, ·29; gape, ·51; tarsus, ·71.

**33. *Dendroeca blackburniæ*, (Gmelin).** BLACKBURNIAN WARBLER. Very common during migrations; not seen in summer. Arrives from the South before the middle of May (10, 1875; 9, 1876; 15, 1877; 7, 1878; 14, 1879), and, like the Bay-breasted and Black-poll (*D. D. castanea* and *striata*), passes rapidly through before the first of June; seen as late as May 28 (1876). In autumn it appears in September (20, 1875), and passes southward before the middle of October. It favors us, in the spring, with a very sweet song; is found in all kinds of woods, but, like *D. virens*, is partial to the hemlocks. It is seen actively searching for insects among the branches, sometimes following them to the ground, where it often spends considerable time. It is gentle and unsuspicious; when it flies towards the observer, thus exposing the glowing orange-red color of its breast, it resembles a moving ball of fire.

*Dimensions.*—Average measurements of thirty-one specimens: length, 5·25; stretch, 8·12; wing, 2·71; tail, 1·96; bill from nostril, ·31; gape, ·55; tarsus, ·72; middle toe, ·39; its claw, ·17.

**34. *Dendroeca striata*, (Forster).** BLACK-POLL WARBLER. Common during spring and fall migrations. Arrives about the middle of May (20, 1874; 23, 1876; 19, 1877; 9, 1878; 14, 1879), remaining till about the first of June (May 29, 1874; 28, 1876; 28, 1877); in the fall it reaches us early in September (10, 1874; 9, 1876), remaining till late in October (16, 1874; 14, 1876).

*Dimensions.*—Average measurements of eighteen specimens: length, 5·56; stretch, 8·90; wing, 2·92; tail, 2·05; bill from nostril, ·30; gape, ·55; tarsus, ·75; middle toe, ·45; its claw, ·17.

**35. *Dendroeca castanea*, (Wilson).** BAY-BREASTED WARBLER. A regular and abundant spring and fall migrant. It passes rapidly through, between the middle and last of May (19 to 29, 1874; 16 to 28, 1876; 18 to 26, 1877; 22, 1878; 14, 1879); returning in autumn it passes us during the last half of September and the first days of October (September 19, 1875; October 3, 1876). The autumnal plumaged birds are generally indistinguishable from the preceding (*D. striata*), when seen in the tree-tops; but I have never seen any specimens that were doubtful upon careful examination. The darker legs of this species may, I think, be taken as diagnostic, and they are otherwise distinguished by the colors of the throat, sides of the breast, and under tail-coverts. Its habits are very similar to those of the Black-poll. It is usually seen in the tree-tops, where its movements are rather heavy, and slow. It seems to be especially fond of bathing in the brooks. Both sexes possess a very sprightly song.

*Dimensions.*—Average measurements of twenty-four specimens:

length, 5·63; stretch, 8·94; wing, 2·95; tail, 2·12; bill from nostril, ·30; tarsus, ·72.

**36. *Dendroeca pennsylvanica*, (Linné).** CHESTNUT-SIDED WARBLER. A summer resident; breeds abundantly. Arrives early in May (11, 1874; 12, 1875; 9, 1876; 15, 1877; 3, 1878; 7, 1879), and departs late in September (30, 1876).

The Chestnut-sided Warbler is the only species of its genus that breeds abundantly with us. Its nest is placed in the fork of a low bush; and its eggs, four in number, are deposited about the last of May, or early in June. I have found the female sitting as early as May 26th (1877). It possesses a song of considerable power and sweetness; utters a sharp *tstip* while gleaning among the branches. The young birds follow the parents, and usually frequent damp thickets. They are quite gentle, coming close up to the observer, and uttering a low squealing note, as if demanding food. The parent sits very closely upon its nest; if disturbed, it refuses to remove farther than a few feet, there remaining quite silent, except a soft, pleading note, occasionally repeated.

*Dimensions.*—Average measurements of sixteen specimens: length, 5·14; stretch, 7·80; wing, 2·45; tail, 2·00; bill from nostril, ·29; gape, ·52; tarsus, ·72; middle toe, ·38; its claw, ·17.

**37. *Dendroeca maculosa*, (Gmelin).** BLACK-AND-YELLOW WARBLER. A common spring and fall migrant. Arrives the second week in May (15, 1874; 11, 1875; 16, 1876; 14, 1877; 8, 1878; 8, 1879), remaining till late in the month (May 22, 1875; 28, 1876; 25, 1878); in autumn it arrives in September (11, 1876; 6, 1879), and departs in October (5, 1876). This beautiful species is partial to the hemlock-trees, where it feeds in company with the Black-throated Green Warbler; but it is found in all kinds of woods. It frequently descends to the ground; sometimes inhabits low bushes.

*Dimensions.*—Average measurements of nineteen specimens: length, 5·12; stretch, 7·67; wing, 2·30; tail, 2·00; bill from nostril, ·30; gape, ·53; tarsus, ·74; middle toe, ·38; its claw, ·17.

**38. *Dendroeca tigrina*, (Gmelin).** CAPE MAY WARBLER. A rather rare migrant. Mr. Wm. K. Lente took a male, at Cold Spring, on the Hudson, May 20, 1875. Mr. Wm. C. Osborn took a female, at Garrisons, on the Hudson, May 15, 1876. Mr. Chas. Simpson found it abundant at Peekskill, during the spring of 1877, when he procured a number of adult specimens. In this locality, the Cape May Warbler is seldom seen in spring. A fine male was shot, by Mr. Wm. C. Osborn, near his residence, on the opposite side of the Hudson, on May 14, 1878; but in autumn it is generally seen in September, on its way to the South. I have observed it from September 8th (1876) to the 20th (1875). It is seen in the tree-tops, where its movements appeared



to me to be very slow and deliberate; and it is generally mute, though on one occasion my attention was attracted to a bird that produced a remarkable jingling noise in a cedar-tree, and proved, on being shot, to be a young male of the present species.

*Dimensions*.—Measurements of No. 1,275 ♂, Conscook Island, Hudson River, September 8, 1876: length, 5·20; stretch, 8·31; wing, 2·69; tail, 2 00; bill from nostril, ·30; tarsus, ·75.

**39. *Dendroica discolor*, (Vieillot).** PRAIRIE WARBLER. A rare summer resident; breeds. I found a nest of this small Warbler, on June 23, 1877. One day, returning from a long tramp, I discovered the nest as I neared home, but not until after I had shot both of the parents; then, too late, I regretted the act, for I was shown their beautiful nest, placed on the low limb of an apple tree beside a cow stable, close to the road-side. The young were full-fledged, and flew away when the nest was approached. The person who showed me the nest seemed grieved at the death of the old birds; remarking that his family had been greatly entertained by the sprightly manners and sweet song of the little birds, which had delighted them since the commencement of summer; and he left the place with a kind wish that the young orphans might thrive, which he afterwards told me he believed was the case. I brought the nest away, together with the old birds; the first and only ones I have ever seen. The nest was an elegant and somewhat bulky structure; felted of cows' hair, strips of bark, and feathers.

*Dimensions*.—Measurements of No. 1,479 ♂, June 23, 1877, Highland Falls, N. Y.: length, 4·88; stretch, 7·15; wing, 2·19; tail, 1·95; bill from nostril, ·28; gape, ·50; tarsus, ·67; middle toe, ·38; its claw, ·15.

**40. *Dendroica palmarum*, (Gmelin).** YELLOW RED POLL WARBLER. A common spring and autumn migrant. Arrives about the middle of April, remaining till the second week in May (April 14 to 25, 1874; 30 to May 8, 1875; 14 to May 8, 1876; 16 to May 5, 1877; 20 to April 27, 1878; 11, 1879). In autumn I have found it from September 20 (1879) to October 24 (1876). It arrives, in company with *D. pinus*, long before the other Warblers, excepting only *D. coronata*. Both species are eminently terrestrial in their habits, and are first seen hopping upon lawns and grassy banks, accompanying the various sorts of Sparrows; later, they are found inhabiting damp, bushy places, beside ponds and streams. The Red-poll's tail executes a perpetual lateral vibratory movement, which is as characteristic as is the tilting motion of the *Siuri*; this motion is often accompanied by a feeble *chip*, the only note I have heard it utter.

*Dimensions*.—Average measurements of nineteen specimens: length, 5·43; stretch, 8·38; wing, 2·61; tail, 2·10; bill from nostril, ·31; gape, ·56; tarsus, ·77; middle toe and claw, ·67.



**41. *Dendroeca pinus*, (Wilson).** PINE-CREEPING WARBLER. A rather rare migrant; not seen during the breeding season. Arrives about the middle of April (May 3, 1875; April 11, 1876; 16, 1877; 15, 1878). Usually appears upon the lawns about the middle of April, associating with *D. palmarum*, and seems, in its habits, quite as terrestrial. It is then (according to my observations) quite mute; does not vibrate its tail like the Yellow Red-poll; but, like that species, its movements are very graceful. Later in the spring it appears in the woods, among the branches, where its movements are slow and deliberate; but, on one occasion, I saw a male darting with considerable celerity, in the top of a birch-tree. I have only seen it in summer on a single occasion, late in August.

*Dimensions*.—Average measurements of four specimens: length, 5.52; stretch, 8.91; wing, 2.81; tail, 2.25; bill from nostril, .33; tarsus, .70.

**42. *Siurus auricapillus*, (Linné).** GOLDEN-CROWNED ACCENTOR; OVEN BIRD. A common summer resident; breeds abundantly. Arrives early in May (8, 1874; 10, 1875; 5, 1876; 7, 1877; April 26, 1878; May 3, 1879), remaining till October (16, 1874; 16, 1876). Its eggs are laid the last of May or early in June. I found a nest containing five eggs on May 30, 1877. Its habit of building a covered nest, and of hovering high above the trees, just before night-fall, and pouring out its delightful song as it descends through the air, serve to attract more general attention and recognition than most of our shy and solitary species do. During the day it utters a loud chant; always monotonous, and sometimes positively disagreeable to the weary listener.

*Dimensions*.—Average measurements of fourteen specimens: length, 6.17; stretch, 9.63; wing, 3.00; tail, 2.15; bill from nostril, .35; gape, .61; tarsus, .91.

**43. *Siurus nævius*, (Boddaert).** AQUATIC ACCENTOR; WATER WAGTAIL. A somewhat common spring and fall migrant. Arrives later than *S. motacilla* (May 5, 1876; 15, 1877; April 26, 1878), remaining till about the first of June (May 29, 1877; 24, 1878). Seen in autumn from August 31st to September 16th (1876). The present species ranges much farther to the North than *S. motacilla*, and rarely, if ever, breeds in this latitude. Still there may be exceptional cases, as there are collectors lower down the Hudson, who assert that they have discovered its nest. Indeed Dr. Coues states<sup>4</sup> that he has himself found it, at Washington, D. C., spending the summer, "under circumstances that leave no doubt of its breeding."

The "Small-billed Water Thrush," as this species is familiarly known, is found skulking among the weeds and *débris*, found on the

<sup>4</sup>Bds. Colo. Val., Vol. I, p. 304, 1878.

muddy margins of ponds, ditches, and the river, while the Large-billed Accentor (*S. motacilla*) is seldom seen in such situations, but evinces a decided preference for clear mountain streams, with pebbly bottoms; neither is it ordinarily seen skulking under cover. The note of the Aquatic Accentor is a metallic *chick*, resembling the common note of the larger species; but it is rather disposed to silence during its brief stay with us. I have never heard its song, which is said to be remarkably fine. This species shares the habit of tilting its body as it moves about, practiced by the two other species of its genus.

*Dimensions*.—Average measurements of eight specimens: length, 6·04; stretch, 9·52; wing, 2·99; tail, 2·11; bill from nostril, ·40; gape, ·67; tarsus, ·84; middle toe, ·55; its claw, ·14.

**44. *Siurus motacilla*, (Vieillot).** LARGE-BILLED ACCENTOR. A common summer resident; breeds. Arrives in April (15, 1874; 30, 1875; 20, 1876; 23, 1877; 19, 1878; 26, 1879); departs early in autumn.

The Large-billed Water Thrush is a charmingly interesting friend of the out-of-doors-naturalist. It is very abundant with us from the time of its arrival, early in April, until late in summer. It sometimes appears here before the winter's snows are past, but even under such conditions it seems to be quite contented, and is in full song. Its song is quite unique; being loud, clear, and unsurpassingly sweet. Frequenting, as it does, the darkly shaded forest streams, that abound in water-falls and cascades, rushing over broken masses of rock, and mossy fallen logs that collect and detain the *débris*; seen in such cool and delightful situations, its song becomes associated in one's mind with its surroundings and accessories. Indeed, its notes cannot be dissociated from the sound of gurgling, rushing waters, and those sights and sensations which impress one so agreeably when in the woods. Even a casual allusion to this little bird recalls, to the mind of the collector, a bright picture of clear mountain streams, with their falls and eddies, their dams of rocks and fallen tree-trunks, their level stretches flowing over bright, pebbly bottoms, with mossy banks and rocky ferneries, and their darting minnows and dace; for only in such wild localities is the Water Wagtail at home. There you will see it sitting upon the stones, close beside the foaming water, expressing its pleasure at its surroundings by constantly repeating, in a complacent tone, its single *chick*. It runs about (never hopping) over the stones and moss, gleaning along the sandy margin of the stream. Occasionally you may see it alight upon the witch-hazel, or alder bushes, that border the water, running dexterously along their branches. It always accompanies every employment with a Sandpiper-like, tilting motion of its body. Now it starts off in pursuit of one of its fellows. They fly through the forest with astonishing velocity, uttering a sharp,

twittering note, that sounds like the noise produced by striking two pebbles rapidly together. As they emerge higher up the stream, the chase is relinquished for the time, and you are surprised as they fly past to hear the clear notes of its song uttered as distinctly in mid-air as when perched; then the chase is renewed, but as they fly back again, one of the birds rises high up in the air above its pursuer, and then flutters slowly downward, pouring out its sweet song as it descends, mingling its cadence with the sound of the brook—the whole effect in perfect harmony with the spirit of the place. These performances take place oftenest early in the morning, about sunrise. At that time its song is loudest and sweetest. The performer is usually stationed upon some lofty tree-top.

The Louisiana Water Thrush builds its nest upon the ground, usually in a bank at the side of a stream. It is placed upon a bed of leaves, and is always protected by a projecting bank, rock or root. There the eggs are deposited quite early in the season, and when, by due process of incubation, they have been metamorphosed into little birds, the first sound that greets the young ears of the nestlings is the voice of the brook, their first sight that of dancing, sparkling waters, whose murmur drowns the rustle in the tree-tops. What wonder that when, reared by its gentle parents' fostering care, it reaches maturity, it should still cling to the memories and associations so early ingrafted, never caring to wander far from the music of its native waters.

We had no reliable account of the nidification of the Large-billed Accentor until Mr. Ernest Ingersoll gave a description of a nest with four fresh eggs, taken in June, 1873, at Franklin Station, New London County, Conn., and fully identified by the capture of the female parent.<sup>5</sup> The nest "was rather loosely and carelessly constructed of fine grass and some little dead fibrous moss; but beneath, a few, and about the outside, particularly in front, many dead leaves were put, as a sort of breastwork to decrease the size of the entrance and more thoroughly conceal the sitting bird. It was underneath the edge of a perpendicular bank eight or ten feet from the water." The eggs, "lustrous white, were more or less profusely spotted all over with dots and specks, and some obscure zigzaggings, of two tints of reddish-brown, with numerous faint points and touches of lilac and very pale underlying red." Dr. Coues gives ("Birds of the Northwest," p. 73, 1874) the following notice: "The Large-billed Water Thrush has been found breeding on the Wachita River, where the nest and eggs were secured by Mr. J. H. Clark, and at Kiowa Agency, where Dr. Palmer also procured them. The one of these two nests in the

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<sup>5</sup> See American Naturalist, Vol. VIII, p. 238.



best condition was built upon a layer of leaves, apparently upon the ground, composed otherwise entirely of rootlets and fine grasses. The other contained five eggs; they are more globular than any of those of *S. noveboracensis* I have seen, but not otherwise different; and other sets would probably not be distinguishable. The roundest one of them measures only 0.69 by 0.59."

These nests remained unique until Mr. William Brewster "had the good fortune to secure two fully identified nests of this species in Knox County, Indiana," in the spring of 1878.<sup>6</sup> "The first, taken with the female parent May 6, contained six eggs, which had been incubated a few days. The locality was the edge of a lonely forest pool in the depths of a cypress swamp near White River. A large tree had fallen into the shallow water, and the earth adhering to the roots formed a nearly vertical but somewhat irregular wall about six feet in height and ten or twelve in breadth. Near the upper edge of this, in a cavity among the finer roots, was placed the nest, which, but for the situation and the peculiar character of its composition, would have been exceedingly conspicuous. The nest, which is before me, is exceedingly large and bulky, measuring externally 3.50 inches in diameter, by 8 inches in length, and 3.50 inches in depth. Its outer wall, a solid mass of soggy dead leaves plastered tightly together by the mud adhering to their surfaces, rises in the form of a rounded parapet, the outer edge of which was nicely graduated to conform to the edge of the earthy bank in which it was placed. In one corner of this mass, and well back, is the nest proper, a neatly rounded, cup-shaped hollow, measuring 2.50 inches in diameter by 2.50 inches in depth. This inner nest is composed of small twigs and green mosses, with a lining of dry grasses and a few hairs of squirrels or other mammals arranged circularly. The eggs found in this nest are of a rounded-oval shape and possess a high polish. Their ground-color is white with a fleshy tint. About the greater ends are numerous large but exceedingly regular blotches of dark umber with fainter sub-markings of pale lavender, while over the remainder of their surface are thickly sprinkled dottings of reddish-brown. But slight variation of marking occurs, and that mainly with regard to the relative size of the blotches upon the greater ends. They measure, respectively, .75 × .63, .78 × .64, .75 × .63, .76 × .62, .76 × .62, .75 × .61."

Mr. Brewster then gives a pleasant description of the second nest, taken May 8, on the opposite side of the same pond, in a precisely similar situation, where his previous experience enabled him to find it directly. In shape it was nearly square, "measuring externally

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<sup>6</sup> See Bulletin of the Nuttall Ornithological Club, Vol. III, No. 3, pp. 133 to 135, July, 1878.



6.50 inches in diameter by 3.54 inches in depth. The inner nest measures 2.73 inches in diameter by 2.50 inches in depth, and is lined with dry grasses, leaf-stems, and a few white hairs. The eggs were four in number and perfectly fresh. They agree closely in shape with those of the first set, and have an equally high polish, but are somewhat more heavily and handsomely marked. The color is creamy-white with heavy blotches of umber-brown generally distributed, but occurring most thickly at the greater ends; fine dottings of lighter brown, and a few spots of pale lavender, fill in the intermediate spaces. They measure, respectively,  $.71 \times .60$ ,  $.71 \times .60$ ,  $.72 \times .60$ ,  $.72 \times .61$ . In each of these two sets the eggs show unusually little variation *inter se*." On May 12, a third nest was found by Mr. Robert Ridgway, on the shore of an isolated little woodland pond, which contained five young birds, well feathered and nearly able to fly. The site, in this instance, was at the foot of a huge stump, the nest being placed in a cavity in the rotten wood. Still another nest was found by Mr. Brewster, April 29, under the bank of White River, among the earth and roots, and well sheltered by the projection of the bank above. The female was sitting upon the empty nest, and was shot as she flew from it.

In "The Oölogist" (Vol. IV, No. 2, pp. 10, 11, April, 1878), Mr. Adolphe B. Covert describes its nest and eggs as follows: "On the 7th of June I found the nest to contain five eggs, and shot the parent bird, which proved to be the Large-billed species. The nest was built on the ground, at the base of a large black ash, partially under and against a large root, which formed an arch over half of the nest. It was composed of a layer of dead leaves, moss, fine roots, and dried grasses, compactly and rather smoothly finished, and lined with fine grass and some cows' hair. The eggs were five in number, white (of a roseate tinge before blown), thickly spotted with small reddish-brown spots; they measure about  $.78$  by  $.59$  inch." I am unable so much as to guess where this nest was discovered, since the author neglects to give any locality.

As the above comprises all that is at present known concerning the nidification of this bird,<sup>7</sup> it will not seem out of place to give, in this connection, the results of my own observations on the nestling of this *Accentor* at Highland Falls, where, as stated at the commencement, it is a common summer resident. I remember quite well the first nest that I discovered—a number of years ago. As I was returning home through the woods one evening, I stopped to drink, hunter fashion, from a cold spring that bursts from the side of a ravine, close

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<sup>7</sup> Besides the above, I am informed that a notice of its breeding appeared in *Forest and Stream*, sometime during the past year.

to a large brook. I was about to drink, when a bird flew right in my face, startling me greatly; but soon I heard the accustomed *chick*, uttered in a loud, complaining tone, and then I saw the bird tilting up and down upon a stone in the middle of the brook. The nest was placed at the side of the spring just above the water, occupying the cavity whence a round stone had been dislodged. It contained four eggs; having embryos considerably advanced. The nest was loosely constructed of strips of bark, grasses, stems of plants, and leaves. A nest was also found in this same spot on a succeeding season, from which five fresh eggs were taken. The eggs of the first set are before me, and are as described by Mr. Brewster, except that the markings are aggregated at the larger ends; the darkest arranged in a circle near that extremity. This nest was found May 31. In 1877, I found as many as six young Water Thrushes in a nest that was built in a pile of *débris* that was lodged in some bushes that grew on a little island in the midst of a large stream. This nest was very artfully concealed, and I had searched for it unsuccessfully ever since the middle of May. The parents always seemed greatly distressed whenever I approached the nest, and always tried to lead me away from it. I should not have discovered it had not the young ones betrayed its presence by their chirping. They left the nest about June 10. On May 7, 1878, I shot a female containing an egg of full size in her oviduct. On the 15th, after a long search and several previous failures, I found a newly finished nest. So carefully was it concealed, that I looked directly into it before making its discovery. By the 21st five eggs were laid, but neither of the parents would approach it. On the 22nd six eggs had been deposited, and I nearly succeeded in capturing the sitting bird; but it slipped away just as I was going to put my hand over it, and ran down the bed of the brook to the large stream, where it remained silent till nearly approached, when it flew into a tree opposite, where it bowed and chipped in a low tone till shot. The nest was placed under the bank of a smaller stream, tributary to a large brook. Its position was such, that only accident, or the most careful search, could discover it. The projecting branches of a laurel-bush still further aided its concealment. The nest presents the following dimensions: internal diameter, 2.95 inches; internal depth, 1.25 inches. The six eggs measure, respectively, .75 × .62; .79 × .65; .77 × .64; .75 × .63; .75 × .63; .74 × .62. This nest and the others resemble so closely, in composition, those already described by Mr. Brewster, that a detailed description is unnecessary; their form and materials differ slightly, according to situation. On May 23, 1878, I took five slightly incubated eggs from a nest that was placed under some brush and roots, in the bank of a small stream that flows into the Buttermilk Falls brook. One of these eggs is in

the hands of Mr. Ernest Ingersoll for illustration of his work on the "Nests and Eggs of American Birds," his original set having been placed where it was not available for the purpose. The remaining four measure, respectively,  $.79 \times .65$ ;  $.80 \times .65$ ;  $.80 \times .64$ ;  $.80 \times .65$ . The nest presents an internal diameter of 2.70 inches; internal depth, 1.40 inches. In this set the eggs are as described by Mr. Brewster, but the markings form a distinct circle about the larger end. In the preceding set the markings are more uniformly distributed, but are most distinct at the great end. May 27, 1879, another nest was found, which contained five young birds nearly full-fledged. Visiting it a few days later, I found the old birds present, but the young had left the nest, but, though not seen, were still in the neighborhood, as was plainly indicated by the actions of the parents, which manifested the utmost concern at my presence; fluttering, and dragging themselves over the leaves with wings extended in a seemingly helpless fashion, they endeavored to lead me away from the spot. This nest was built far under the jutting margin of the stream; also tributary to a larger one. It was only discovered by my having actually placed my hand upon the young birds while exploring in search of the nest.

Of the six nests above enumerated, three were found under the projecting margins of small brooks, near their anastomoses with larger streams, two at the side of a spring close to a large brook, and one on an island in the middle of a large stream. It would seem, from the circumstance that the Water Thrush usually builds *away* from the large stream, that its sagacity leads it to select for its nesting site a position less liable to endanger the lives of its progeny by subsequent accidents of storm and flood. The Accentor sometimes builds very early. I am confident that the eggs taken by myself do not represent the earliest period of its nestling, since I have shot specimens containing full-sized ova in their oviducts as early as May 1st.

*Dimensions.*—Average measurements of twenty-two specimens: length, 6.28; stretch, 10.45; wing, 3.23; tail, 2.14; bill from nostril, .39; gape, .70; tarsus, .91; middle toe, .58; its claw, .17.

**45. *Geothlypis trichas*, (Linné).** MARYLAND YELLOW-THROAT. A common summer resident; breeds. Arrives early in May (11, 1874; 10, 1875; 8, 1876; 8, 1877; 4, 1878; 8, 1879), and remains till the middle of October.

The Yellow-throat deposits its eggs late in May. I found two nests, each containing four eggs, as early as May 24, 1878. The nest is generally placed among thick bushes—frequently in a small cedar —, or suspended in a tussock of rank grass; in form it is deep, and purse-shaped. One found in a wet meadow, was built over a little stream, or watercourse, being suspended to the interlaced grasses



which were brought from either side of the ditch and fastened together. Could this artifice have been resorted to as a means of protection against the attacks of predatory animals? The nest was deep, and more compactly felted than is common. Its nest is very commonly suspended to the rushes of the marshes that border the Hudson.

The Maryland Yellow-throat delights to inhabit wet meadows and swampy thickets, in which it moves restlessly about, uttering a sharp *chick*, and numerous chattering notes. In spring, after the pairing season, the various mated couples ramble through the thickets and rank grass, constantly reminding their partners of their whereabouts by a sharp, clicking call-note. Its song is loud and sweet. You may often see it upon a rail-fence singing, in very much the same attitude as that assumed by the Song Sparrow (*Melospiza melodia*); at other times it chooses for a rostrum the highest tree-top. Just before night-fall it may be seen flying up in the air, singing as it goes, writhing its body as does the Yellow-breasted Chat (*Icteria virens*); then it suddenly drops to the ground.

*Dimensions*.—Average measurements of eighteen specimens: length, 5·33; stretch, 7·20; wing, 2·17; tail, 2·05; bill from nostril, ·31; gape, ·58; tarsus, ·80; middle toe, ·50; its claw, ·20.

**46. *Geothlypis philadelphia*, (Wilson).** MOURNING GROUND WARBLER. A rare migrant. Arrives about the middle of May (13, 1878), departing before June (May 26, 1876). Prof. James M. De Garmo showed me a specimen taken at Rhinebeck on the Hudson. It has also been taken by the collectors lower down the river, and Mr. George N. Lawrence includes it in his list of the birds of the vicinity of New York.<sup>8</sup> Mr. George Welch met with these birds in the Adirondacks, in June, 1870, where they seemed rather abundant, and were evidently breeding. Mr. John Burroughs found its nest at the head-waters of the Delaware River, at Roxbury, Delaware County, N. Y.; has frequently observed this Warbler in that section. "About the head of the Neversink and Esopus, in the northern part of Ulster County, New York, they are the prevailing Warbler, and their song may be heard all day long." Dr. C. Hart Merriam some years since described its nestling, as observed at Locust Grove, Lewis County, N. Y., in the "American Naturalist"; he further adds:<sup>9</sup> "Large numbers of them breed regularly, in suitable localities, in Lewis and Herkimer Counties, in northern New York."

*Dimensions*.—Measurements of No. 1,000, ♂ ad., May 26, 1876, Highland Falls, N. Y., E. A. M.: length, 5·63; stretch, 8·13; wing, 2·56; tail,

<sup>8</sup> Ann. Lyc. Nat. Hist., Vol. VIII, p. 283, April, 1866.

<sup>9</sup> Trans. Conn. Acad., Vol. VI, p. 23, 1877.



2·13; culmen, ·39; bill from nostril, ·32; gape, ·57; tarsus, ·78; middle toe, ·53; its claw, ·18.

**47. *Icteria virens*, (Linné.) YELLOW-BREASTED CHAT.** A common summer resident, breeding plentifully. Arrives before the middle of May (24, 1873; 12, 1874; 1, 1875 [Frederic S. Osborn], 9 [Mearns]; 3, 1876; 7, 1877; 7, 1878; 7, 1879), and spends the summer.

The Yellow-breasted Chat is sure to attract attention by the singularity of its habits and voice. Several pairs of Chats always nestle in some bushy fields in the neighborhood of my house, where they keep up an incessant clatter during the early part of the season. I have sometimes heard it at intervals during the night. It is quite shy, and by a judicious use of its remarkable ventriloquial powers can generally manage to keep out of harm's way. Among other equally ridiculous performances, it has the habit of flying up in the air, with its legs dangling, then allowing itself to drop nearly to the ground. Its eggs, four in number—sometimes five—are deposited about the first of June (found two nests June 1st and 3rd, 1873, each containing four eggs), in a nest built in a thicket. Mr. Peter de Nottbeck showed me specimens shot as far up the Hudson as Fishkill Landing, where he has also procured specimens of the Hooded Warbler (*Myiodiotes mitratus*) and Worm-eating Warbler (*Helmitherus vermivorus*).

*Dimensions*.—Average measurements of nine specimens: length, 7·44; stretch, 9·98; wing, 3·00; tail, 3·07; bill from nostril, ·41; gape, ·78; tarsus, 1·02; middle toe, ·64; its claw, ·24.

**48. *Myiodiotes mitratus*, (Gmelin). HOODED WARBLER.** A very common summer resident; breeds abundantly. Arrives before the middle of May (11, 1875; 8, 1876; 15, 1877; 4, 1878; 12, 1879); remains till about the middle of September (5 and 8, 1874).

The Hooded Warbler is one of our most abundant summer Warblers. It is a very attractive species, both on account of its brilliant plumage and its delicious song. It is found in solitary woodlands, where it may be easily traced by its loud notes, which continue throughout the summer. It builds its nest in the crotch of some low bush, very often that of a laurel (*Kalmia*); it is a neat, well-felted structure, which bears some resemblance to that of the Indigo Bird (*Cyanospiza cyanea*). Its eggs (first brood) are laid about the last of May (26, 1877). Four is the usual complement, although five are occasionally deposited. Owing to its situation, the nest is not easily discovered, unless by watching the parents during its construction; nevertheless I have taken no less than three, each containing four fresh eggs, during a single walk. Its eggs are white (possessing a beautiful glow of pink before their contents are extracted), with more or less heavy spotting of red, chiefly about their larger ends. Sometimes sets are found which are nearly immaculate, while others are

quite heavily marked about the greater end with purplish-red. Four sets of eggs, taken here, have an average of  $.71 \times .53$  of an inch: extremes,  $.67 \times .52$ , and  $.74 \times .55$ . The common note of the Hooded Warbler is a sharp, metallic *chick*; it possesses, besides, a song of remarkable beauty.

Recent investigations are disclosing the fact that this beautiful species has a more extensive range in this State, and to the eastward, than was formerly supposed. Giraud says:<sup>10</sup> "With us [on Long Island], the Hooded Flycatching Warbler is not abundant. . . . It is generally met with in low situations; feeds on winged insects; and its note is loud, lively and agreeable." De Kay observes:<sup>11</sup> "This well marked but rare species in this State, was shot in Westchester county, about the middle of May." Mr. George N. Lawrence states:<sup>12</sup> "This beautiful species is not abundant [in the vicinity of New York], but several times in the month of July I have observed it in swampy situations, on the top of the Palisades, in the vicinity of Fort Lee, where it was breeding." Mr. Eugene P. Bicknell finds it breeding commonly, at Riverdale, on the Hudson.<sup>13</sup> Dr. A. K. Fisher mentions seeing a specimen at Sing Sing, on the Hudson, as late as September 19, 1878, though I think this was the only occasion on which he has found it there, although the Kentucky Warbler (*Oporornis formosus*) breeds plentifully. Mr. John Burroughs informs me that he does not find it at Esopus, on the Hudson; but Mr. Peter de Nottbeck has taken it in the Fishkill Mountains and vicinity. In his recent "Revised List of Birds of Central New York," p. 14, April, 1879, Mr. Frank R. Rathbun gives this species as "common in dense forests with a heavy undergrowth. Sixty-six specimens of this species taken during the months of July, August, and September 1878. Nest found July 25, 1878, containing three young and one egg. Northern Cayuga and North Eastern Wayne Counties, N. Y." Messrs. Rathbun and F. S. Wright further remark (Bull. Nutt. Orn. Club, Vol. IV, No. 2, p. 117, April, 1879) that they "observed this Warbler [same locality] as late as September 20, when a few cold breezes from the lake [Ontario] drove them southward." Dr. C. Hart Merriam observes:<sup>14</sup> "On the 9th of September last (1878), at Lowville, an adult male of this species was killed by a cat and brought, while still warm, to Mr. Romeyn B. Hough, who now has the specimen. So far north of its known range it can hardly be considered more than a straggler." In speaking of this species in connection with several others, Mr. H. A. Purdie

<sup>10</sup>Bds. Long Island, p. 48, 1844.

<sup>11</sup>Zoology of New York, Part II, p. 107, 1844.

<sup>12</sup>Ann. Lyc. Nat. Hist., Vol. VIII, pp. 284, 285, April, 1866.

<sup>13</sup>See Bull. Nutt. Orn. Club, Vol. III, No. 3, p. 130, July, 1878.

<sup>14</sup>Bull. Nutt. Orn. Club, Vol. IV, No. 1, p. 7, January, 1879.

remarks:<sup>15</sup> they "are not rare at Saybrook, Conn., but breed there regularly in more or less numbers, and probably occur all along the Sound shore west of the mouth of the Connecticut River." Mr. Erwin I. Shores shot a male of this species, at Suffield, Conn., near the Massachusetts border, but in the Connecticut Valley, July 8, 1875, as recorded by Mr. Purdie, in the Nuttall Bulletin, Vol. II, No. 1, p. 21, January, 1877.

*Dimensions.* — Average measurements of thirty-nine specimens: length, 5·67; stretch, 8·25; wing, 2·58; tail, 2·30; bill from nostril, ·31; gape, ·58; tarsus, ·77; middle toe, ·44; its claw, ·19.

[*To be continued.*]

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<sup>15</sup> Bull. Nutt. Orn. Club, Vol. I, No. 3, p. 73, September, 1876.



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SALEM, SEPTEMBER 1, 1879.

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# BULLETIN

OF THE

## ESSEX INSTITUTE.

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WEDNESDAY, AUG. 27, 1879. A DAY WITH COL. FRENCH.

THE Field Meeting, this day, was held at "Rock Lawn," the name given to the fine estate of Col. Jonas H. French at Bay View, Gloucester. From one hundred and eighty to two hundred persons went down in the train from Salem, and at the meeting there were about five hundred present, the Cape Ann Scientific and Literary Association uniting with the members of the Institute and their friends from Salem and its neighborhood. The passages, going and returning, both on the cars and by stage and barge from the depot in Gloucester to Bay View, were not devoid of interest; the waves rolled in before the east wind, and it was interesting to watch the line of white foam, in the distance, as the sea rolled over hidden breakers along the shore; the old houses to be seen, here and there, along the Annisquam road, were indicative of an old and interesting settlement, which, though destitute of the appliances of affluence, were nevertheless marked by all the comfort and contentment which an old fashioned fishing community is capable of producing. Here and there, women were noticed attending to their garden patches, weeding their flowers, gathering apples,



and, in at least one case, attaching to a long pole, what might pass as the "old oaken bucket" that was to draw water from the well near by. Rocks are plentifully scattered all over the cape, and the huge boulders and projecting ledges indicated a section prolific in sienitic granite.

Col. French's estate is spacious and elegant. He threw open his house to the visitors, his extensive lawns were at their disposal, and his hospitality was unbounded. Col. French's house and that of Gen. Butler are in one lawn enclosure. Both houses are built of stone, but Col. French has obviously made far the greater outlay in improvements upon his estate, and appears to be permanently identified by association, residence, and business with this part of the city upon Cape Ann.

A visit was made to the stone-works and granite quarries, and Col. French and those holding responsible positions at the works were attentive in showing the visitors the many interesting things that are to be seen. In the sheds along the road and upon the pier built with the debris of the quarries, the finishing and ornamenting of the stone are carried on, by the usual process of the stone cutters, with mallet and chisel. The work now in progress is for the Boston Post Office extension. The quarry, from which the granite (or sienite, more properly) is taken, is about half of a mile from the road, and the party were conveyed thither on the open platform cars used in transporting the stone, the same being pushed over the ascending grade by the locomotive employed at the works. The company comprised three train loads. Here in the quarries the process of drilling was going on by large numbers of men, and in one place was noticed the tireless and rapid working of the Ingersol steam drill, boring with great rapidity into the solid rock. The stone was lifted from the quarries by large derricks operated by

a stationary steam engine. Some of the party descended the steep and precipitous stairs almost to the bottom of the quarry to inspect the rift made in the solid ledge by the great blast recently made under the supervision of the foreman, J. Henry Jones, by which a mass of rock weighing by actual computation 40,000 tons had been rent asunder and lifted from its solid foundation. This was accomplished by the drilling of twenty holes, each eight feet in depth, and the use of 425 pounds of powder. The fissure made is two hundred feet in length and eighty-five wide at the widest part, and enabled Mr. Jones to get a bottom to the solid mass from which to work upon.

Two blasts by the electric process were made while the company were present, each moving a huge rock and separating it from the ledge without any destructive crash or fall. Upon the wharf and at points near the road and about the quarries, are piles of block paving stones, used extensively in the cities, and in some places in the neighborhood for mortar-wall foundations, for which it seems to be well adapted.

The company, that operates these quarries, is the Cape Ann Granite Company. It owns a large tract of land, extending back from the water across Washington street and up the hill about one mile, covering an area of 175 or 200 acres. The present proprietors purchased the land in 1869, and began work in April of the same year. The company employs from 300 to 600 men according to the state of business. It owns several tenement houses, which are rented to the workmen having families, and a large boarding house, where those without families are boarded. A store, post office and telegraph office are managed by the company. The extended pier, from which vessels are loaded, was made of refuse granite. A railway was laid in 1870 from the end of this wharf up the hill, and has

branches extending to all the quarries. A large locomotive and a train of flat cars do the transporting.

The largest single piece of granite ever quarried here was the base of the Scott monument at Washington, cut in 1873. It was 28 feet 2 inches in length, 18 feet 5 inches in width, 3 feet 2 $\frac{3}{4}$  inches in thickness, and contained 1659 cubic feet. The weight before finishing was 150 $\frac{1}{2}$  tons; after finishing, 119 tons. The granite for the Post Office and Sub-Treasury in Boston was all quarried here. Bay View granite was also used in the construction, among other buildings, of the Patent Office and the Scott monument at Washington, the Danvers Insane Asylum, the Military Academy at West Point and the New York and Brooklyn bridge.

Upon returning to Rock Lawn, the party proceeded, under the escort of the Gloucester Cornet Band, to Davis Neck, where under a pavilion were well spread tables furnished by our host, beautifully decorated with pot plants, flowers and ferns. The baskets brought by the ladies seemed to be an unnecessary appendage. After partaking of the refreshments, the tent was prepared for the afternoon session. Davis Neck is a point of land projecting from the estate, and is connected with the main land by a hard sand beach, which is covered by water at high tide, and is "navigable" for teams and foot passengers at other times. The point therefore possesses the duplex character of an island and a peninsula according to the state of the tide. Both from this point, and the more elevated ground on which the residence stands, a fine view of the northern shore may be had, including the hills of Ipswich and Rowley, the mouths of the rivers bearing their names, Plum Island, the low and long lines of sandy beach beyond, stretching away very dimly in the distance, and the broad and capacious intervening bay. There is a

life-saving-station on this Point, and the house was opened for the inspection of the visitors. It contains bunks and bedding in the attic, and stove and cooking utensils for the accommodation of the men stationed there. In the main part is the long life-boat provided with oars attached to the boat by cordage. There are coils of rope, and a mortar with a ball and other appliances for the throwing of lines to shipwrecked people needing succor. During the winter seven or eight men are stationed here, but at this time there was only one. During the five years since the station has been established, nine or ten persons have been rescued from wrecks.

The afternoon session was called to order at 3 P. M. The PRESIDENT in the chair. The records of the preceding meeting were read by the SECRETARY. The PRESIDENT in his introductory remarks alluded to the eleven field meetings<sup>1</sup> previously held in the different precincts of old Gloucester, and spoke of the pleasure he felt in holding this meeting jointly with the Cape Ann Scientific and Literary Association. After remarking upon the generous hospitality of Col. FRENCH, he introduced him to the audience.

Col. FRENCH, in a very pleasant manner, welcomed the members of the two societies to "Rock Lawn," and was

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<sup>1</sup>The time when and the place where these meetings were held:—

1. Monday, July 16, 1860. West Gloucester, under an apple tree in front of a farmer's house, near Richardson Hall.
2. Friday, July 12, 1861. Kettle Cove, in the woods near by.
3. Thursday, August 7, 1862. Johnson's Hall, Rockport.
4. Friday, August 7, 1863. Universalist Church, Rockport.
5. Wednesday, August 10, 1864. Town Hall, Gloucester.
6. Friday, September 14, 1866. Independent Christian Church, Gloucester.
7. Thursday, August 26, 1869. Pavilion Grounds, Pigeon Cove.
8. Thursday, June 29, 1871. Baptist Church, East Gloucester.
9. Thursday, August 8, 1872. Universalist Church, Annisquam.
10. Thursday, August 6, 1874. Town Hall, Rockport.
11. Wednesday, July 18, 1877. Congregationalist Church, Lanesville.



pleased to have so many of them present, and while admitting that he was no scientist, he expressed his readiness always to aid them, fully recognizing the worthy objects of their respective organizations. Regarding the quarries visited, he humorously remarked, the most that he could do was to explain how the stone was taken out, and to say that "it was for sale at very low prices." He paid, however, an incidental tribute to science, saying that he found they could get the stone out more economically by bringing to bear upon the process the best knowledge and the best machinery.

Dr. THOMAS CONANT, President of the Cape Ann Scientific and Literary Association, followed in some remarks in an humorous strain, concerning the natural habits of the clam. He made reference to several Indian relics, which were exhibited to the audience, and gave a brief history of the society, which was formed five years ago this autumn, has one hundred and sixty to one hundred and seventy members, averages thirty at its regular meetings and from fifty to one hundred at its field meetings. An interest in scientific subjects was stimulated at the meetings; also by classes which meet weekly. A museum has been commenced with some excellent specimens, some of which were presented by the United States Fish Commission. He thanked the host for the bountiful manner in which he had brought together the two societies, one the oldest and the other perhaps the youngest in the county, to discuss scientific subjects.

JAMES DAVIS, Judge of the Gloucester Police Court, spoke of the rocks and ledges and how much they added to the material prosperity of the place. He endorsed the objects of the meeting and paid a deserved compliment to the host on this occasion.

Mr. JAMES H. EMERTON said that he had found very few specimens in his special line of investigation, a large portion of the time having been spent among the quarries. He spoke of the work of the sister society of the Cape as most commendable, and hoped that the fishermen would be requested to collect specimens during their various fishing trips for the cabinets of the society.

CHARLES D. DRAKE, Chief Justice of the Court of Claims at Washington, made a speech that was well seasoned with humor, expressing admiration for the spirit of this institution in collecting the varied specimens, but saying that he knew nothing about science. Alluding to his friend, Hon. Wm. S. Messervy of Salem, who sat near, he recalled the time when, forty-five years ago, they began life together in St. Louis, and when they made whig speeches there at a later period. He was impressed with the attendance of so large and intelligent a gathering, and had been surprised to notice so many people listening attentively to the various speakers of the afternoon. After drawing a comparison between this and similar gatherings at the west, he closed by saying that, in his judgment, the people of the New England States were the most intelligent, most favored, and most happy of any on the face of the earth.

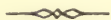
Prof. A. HYATT, of the Boston Society of Natural History, spoke of the work of that Society, of the Essex Institute, of the Cape Ann Society and similar associations, as most worthy to be pursued, and that the future results for good could not be fully realized by those persons now engaged therein; he said, he thought it not inappropriate to call attention to the fact that societies are liable to lose sight of the object that lies before them—these organiza-

tions being the key-note of the new movement in education. We can do all we set out to do, if we keep the object held up to view ; for, by constantly living up to the ideal, every obstacle clears before our pathway.

Dr. ADDISON DAVIS of Gloucester spoke briefly. Mr. CHARLES H. SARGENT of Lanesville exhibited and remarked about an Indian stone pestle and other relics. Hon. WM. S. MESSERVY of Salem alluded briefly to Judge Drake, and among other things said, that forty years ago it took him four months to go from Salem to Santa Fé in New Mexico, while now the distance could be accomplished in about a week.

N. A. HORTON of the Salem Gazette being called upon, gave a brief résumé of the doings and objects of the Essex Institute, and in conclusion said : Many years ago enterprising men from Salem sailed over this broad ocean, and brought home wealth from distant lands. They used this wealth in educating their children, and thus gave to Salem no inconsiderable degree of culture. A taste for knowledge and for Natural History grew out of this, and, from small beginnings, this Essex Institute was formed. Beyond the circumstances of its early formation, it is not a purely local Salem Society, but an Essex County Institution, seeking to preserve for the benefit of the people all the facts pertaining to the civil and natural history of the county, and to promote the diffusion of knowledge among the people. That is the object of the field meetings. Of the many that have been held, it has, perhaps, never been the fortune of the Society to receive such hospitality as has been shown to-day by the proprietor of this place. He offered a vote of thanks to Col. French for these attentions, and also to those employed in differ-

ent positions by the Cape Ann Granite Company (Messrs. Henry C. Bennett, George W. Quinn and Scott Webber), as well as to the Gloucester Society for the courtesies which had caused the day to pass so pleasantly. The resolution was adopted and the meeting adjourned. After the exercises at the tent, many of the party adjourned to the house, where there was some fine singing and piano playing by Miss Ita Welsh of Boston, Miss Chamberlain, daughter of warden Chamberlain of Concord and Mr. Wm. Teel of Cambridge.



#### REGULAR MEETING, MONDAY, SEPTEMBER 15, 1879.

MEETING this evening at 7.30 o'clock. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Sidney Perley of Boxford was duly elected a member.

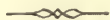
Mr. JAMES SAMUELSON of Liverpool, England, occupied the hour with an instructive lecture on

#### *Darwinism.*

He began by referring to the changes, which have taken place, in the method of teaching natural science during the last fifty years, and in speaking of the extension of nature-study, he drew the attention of his hearers to the admirable arrangements for imparting such instruction in our common schools, some of which he has visited. After touching upon the direct influences of natural study on astronomy, geography and physics, he treated of the beginning of life in the globe and the doctrine of spontaneous generation, which he said is abandoned by the



leading men of science. He then went on to speak of the present aspect of animated nature, and of the various theories which have been broached to account for the production of new species, referring more particularly to those of Lamarek, the author of the "Vestiges of Creation," and those of Darwin and Wallace. His observations on the theory, or as he called it the "hypothesis" of natural selection, were illustrated by some very beautiful examples of foreign and indigenous animals, such as birds, insects, etc., and he was aided in this portion of his address by some beautiful objects from the museum. After explaining the various phenomena which accompany the survival of the fittest forms of life, Mr. Samuelson dealt very freely with the theological aspect of the question, noticing the views of atheists, agnostics and reconciliators. He then reviewed briefly the conceptions of the Deity in relation to nature which have been formed from the earliest ages, and read extracts from the works of Darwin and Wallace, to show that they believe implicitly in the supervision and directing agency of an allwise Providence. Kingsley, too, was quoted by him, to show that the anthropomorphic views of the Deity are fading away, and the lecturer concluded with a warm recommendation to his hearers to study nature conscientiously and earnestly, as calculated to impart higher and nobler views of the divine nature.



THURSDAY, SEPTEMBER 18, 1879.

MR. SAMUELSON gave his second lecture this evening.  
The subject:—

*The Classification of Animals.*

After briefly recapitulating the chief points in the theory of natural selection, he proceeded to show that the

standard of classification is "species," and then explained, with the aid of the blackboard, how new species are supposed to be produced. Aids to classification next occupied his attention, and some of the chief facts of palæontology and embryology were referred to, in order to show that no system can be complete without the study of those branches of natural history. He then showed typical examples of the great subdivision of the animal kingdom, some of the specimens being from the museum; and by means of numerous diagrams he pointed out the various features of the animal kingdom which play a part in classification, exhibiting the "archetypes" of the vertebrates and invertebrates. Mr. Samuelson finally drew a comparison between the changes that have taken place in the natural world, in history, and in society, and showed that the whole plan and execution of the phenomena of the universe are clearly under the guidance of one Perfect Intelligence.

At the close of the lecture, Rev. E. C. BOLLES spoke of the pleasure he had derived from the interesting and instructive lectures, and submitted the following:—

*Resolved*, That the hearty thanks of the Essex Institute are tendered to James Samuelson of Liverpool, England, for the two very instructive lectures delivered by him before this Society on this and the preceding Monday evenings.

Mr. D. B. HAGAR in seconding the resolution, spoke of the lecture given before the scholars of the State Normal School, who derived much information on an important topic. The resolution was then unanimously adopted.

Mr. SAMUELSON gracefully responded, hoping that he should at some future time have the pleasure of revisiting this city.

MONDAY, OCTOBER 6, 1879.

REGULAR MEETING this evening at 7.30 o'clock. PRESIDENT in the chair. Records read.

James Devereux Waters was elected a member.

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MONDAY, OCTOBER 20, 1879.

REGULAR MEETING this evening. PRESIDENT in the chair. Records read. Donations and correspondence announced.

Mr. WILLIAM H. TAPPAN of Manchester read an interesting paper on

*Gold and Silver Mines and Mining.*

He spoke of the early discoveries of gold in various countries, described and compared the various mining processes adopted at different periods. The principal part of the paper was devoted to the mines and mining of California, describing the habits of those who were pioneers in the early period of the gold excitement, the manner then adopted in procuring the precious metal, and tracing the gradual changes that have from time to time been adopted, not only in the mode of living, habits, etc., of the miners, but in the new and improved processes of working the mines and in smelting the ore.

At the adjournment of the meeting held on Tuesday, October 21, at noon, Mr. Theodore M. Osborn of Peabody was elected a member; and Mr. James Samuelson of Liverpool, England, a corresponding member.

MONDAY, NOVEMBER 3, 1879.

REGULAR MEETING this evening at 7.30 P. M. Adjourned to the following day at 4 P. M.

Horace C. Burnham, Willard H. Brown, Ellen Buffington Kebew, all of Salem, were elected members.

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MONDAY, NOVEMBER 17, 1879.

REGULAR MEETING this evening at 7.30 o'clock. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Mary H. Plummer of Salem was elected a member.

Mr. J. H. EMERTON read a very interesting paper on

*The Animals of the Bottom of Salem Harbor.*

He showed a map of the neighborhood of Salem from Swampscott to Manchester, and explained the character of the shores and of the bottom in different parts of the harbor, and then described some of the most common animals living at various depths, beginning with those between tides. Here are found many species which prefer to be exposed to the air part of the time. The barnacles swim about when they are young, and attach themselves to everything up to high water mark. The common clams live buried in mud, which is uncovered at every tide. Several snails, although they crawl about freely, live out of water part of the time, among stones between tides. The mussels cover the posts of wharves and bridges almost up to high tide, and cover the entire bottom in some places, as Beverly bar.



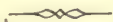
Just below low water live a great variety of animals, among them the common crabs and lobsters, the sea-anemones and many species of hydroids which cover the stones like sea-weeds. On muddy bottoms the eel-grass shelters a large number of animals. The bottom of the harbor down to a depth of four or five fathoms is soft mud, like that found in coves and docks, becoming gradually cleaner as the depth increases. In this mud live several species of worms and mollusks. To get at them the mud is put in a sieve and water poured on, until the finer part is washed through and the animals left on the sieve. On this shallow bottom, where there are shells or stones enough to hold it, grows the laminaria or devil's apron, and among its roots live the long-armed star fishes and several other shallow water animals. Beyond the mud a large part of the harbor is rocky, with here and there small stones and gravel. The common animals here are the sea-eggs (*Echini*), chitons, several species of shrimp, the thick-armed sea-anemone and the red Lophothuria. Beyond the islands a softer bottom is found in the channels, and here live Terebratulina, several species of sponges and star fishes not found in shallower water. This bottom becomes hardened in some places into irregular lumps, filled with the tubes of worms and other animals.

The apparatus used for dredging the past summer was exhibited and explained. The specimens were most of them too small to be shown at the meeting, but all are arranged at the museum, where they can be seen by visitors.

MONDAY, DECEMBER 1, 1879.

MEETING this evening adjourned to the following day, Tuesday, at noon.

Moses W. Putnam of Danvers was elected a member.



MONDAY, DECEMBER 15, 1879.

REGULAR MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Ellen Osborne Proctor of Peabody was elected a member.

WINFIELD S. NEVINS occupied the evening in giving

*An Account of a Visit to Pompeii.*

The speaker, in opening, referred briefly to the natural beauties of the vicinity of Vesuvius and Pompeii; also to the *Museo Borbonico* in Naples, where are stored so many of the relics of ruined Pompeii and Herculaneum. The journey to the former city was described and then the ruins themselves. The city was spoken of as being somewhat larger than the settled portion of Salem, less than one-half of which has yet been unearthed; with narrow streets, low houses, the ceilings fallen in, and the upper stories gone. The Forum, Temple of Jupiter and other monuments of Pompeian glory were described. The widest streets of the city are scarcely twenty feet in width, and some but two and a half yards from wall to wall. They are paved with polygonal blocks of lava, in which time and traffic have made but little impression.

Among the numerous points of interest none was more remarkable than the bakery, where not long ago the excavators discovered in an oven eighty-one loaves of bread, whole and hard though somewhat blackened. Bill boards were used extensively in ancient Pompeii, not only to announce amusements but to proclaim candidates for office, advertise lost goods and the like. The Pompeian dwellings were next described and some of the customs of the people. Art, the speaker thought, never attained a high standard in the city, though there were very many art works of one kind and another. The ruins of the two theatres and the amphitheatre were described, and the account of Pompeii closed with a description of an imaginary funeral conducted after the custom of those days. Mt. Vesuvius was then sketched together with some of the more important of the numerous eruptions which have occurred during the Christian era. The eruption of A. D. 79 was probably the most destructive. It is not believed that a particle of lava flowed from the volcano at this time, but that Pompeii was buried with hot ashes and scoriæ, and Herculaneum with substantially the same material though it was often mixed with vapor forming a soft running mud which eventually hardened. The eruption of 1631 was also very destructive, many thousand lives being lost. During this eruption a stone weighing twenty-five tons was thrown five miles. The eruption of 1794 was also very destructive. Two days after the lava from this eruption reached the ocean, the water one hundred yards from shore was so hot that boats could not float in it, because the pitch in their seams would melt at once. The temperature of lava often exceeds 2000° F. Mr. Nevins closed with an account of the experience of himself and two friends in ascending the cone of Vesuvius to the crater, during a stormy day in the spring of 1878.

*A List of the Birds of the Hudson Highlands, with  
Annotations.*

BY EDGAR A. MEARNS.

[Continued from page 168]

**49. *Myiodioctes canadensis*, (Linné).** CANADIAN FLYCATCHING WARBLER. Very common during its migrations. Arrives about the middle of May (16, 1876; 18, 1877; 10, 1878; 12, 1879), remaining till about June 1 (May 28, 1876; 25, 1877; 25, 1878; 27, 1879). In autumn seen as early as September 9 (1876). It is found in humid places, and has a loud, pleasant song.

*Dimensions.*—Average measurements of nineteen specimens: length, 5·61; stretch, 8·05; wing, 2·53; tail, 2·23; bill from nostril, ·31; gape, ·58; tarsus, ·75; middle toe, ·20; its claw, ·18.

**50. *Myiodioctes pusillus*, (Wilson).** WILSON'S GREEN BLACK-CAPPED FLYCATCHING WARBLER. A very rare migrant. Arrives about the middle of May (12, 1875; 17, 1877; 17, 1879). The few I have seen, were found in dense, tangled thickets. Its note is a sharp *chip*. Mr. Thomas W. Wilson took a fine male May 16, 1876, at Cold Spring, on the Hudson.

*Dimensions.*—Average measurements of two adult males: length, 5·00; stretch, 6·97; wing, 2·21; tail, 2·03; bill from nostril, ·25; gape, ·48; tarsus, ·70; middle toe, ·44; its claw, ·18. *Female*, No. 1,916, Highland Falls, N. Y., May 17, 1879: length, 4·90; stretch, 6·75; wing, 2·10; tail, 2·00; bill from nostril, ·24; gape, ·48; tarsus, ·70; middle toe, ·44; its claw, ·18.

**51. *Setophaga ruticilla*, (Linné).** AMERICAN REDSTART. A common summer resident; breeds abundantly. Arrives early in May (8, 1873; 9, 1874; 11, 1875; 5, 1876; 9, 1877; April 27, 1878; May 3, 1879), remaining until late in September (30, 1873; October 4, 1876; September 23, 1878). Its sweet song, and the peculiar habit of spreading its tail and wings so as to expose their bright orange-red color, make the Redstart generally well known.

*Dimensions.*—Average measurements of sixteen specimens: length, 5·41; stretch, 7·88; wing, 2·57; tail, 2·27; bill from nostril, ·27; gape, ·51; tarsus, ·66; middle toe, ·39; its claw, ·16.

Family, **TANAGRIDÆ.**

**52. *Pyranga rubra*, (Linné).** SCARLET TANAGER. A common summer resident; breeds abundantly. Arrives about the second week



in May (9, 1872; 13, 1873; 9, 1874; 14, 1875; 12, 1876; 15, 1877; 3, 1878; 8, 1879), remaining till October (3, 1874; 8, 1876; 4, 1878). This gorgeously plumaged species is numerous in summer. It commences to incubate its eggs early in June; took nests containing the full complement of eggs June 4 and 6, 1877.

*Dimensions.*—Average measurements of forty-three specimens: length, 7·25; stretch, 11·85; wing, 3·74; tail, 2·69; bill from nostril, ·46; gape, ·76; tarsus, ·77; middle toe, ·52; its claw, ·25.

### Family, **HIRUNDINIDÆ.**

**53. *Hirundo erythrogastra*, Boddaert.** AMERICAN BARN SWALLOW. An abundant summer resident; breeds. Arrives in April (27, 1872; 29, 1873; 25, 1874; 30, 1875; 30, 1876; 23, 1877; 23, 1878; 22, 1879), remaining until some time in September (19, 1874; 12, 1876; 6, 1879). It begins to build the last of May, and its eggs are deposited early in June.

I recently had an opportunity of observing the actions of the Swallows when congregated preparatory to taking their departure to the South, and overtaken by a severe and protracted rain-storm. The locality was a secluded pond, where no buildings afforded them protection, even at night. It was the third day of the storm, and nearly evening, when I visited the spot. The Swallows were sitting in circular lines upon some pyramidal shaped rocks out in the water, where they spent most of the time, their dripping rows making a very pitiful spectacle. At times a small band would rise with great exertion and attempt to fly to the shore, where they alighted upon the nearest object in utter exhaustion; some of them upon the stones at my very feet. I splashed a large stone into the water close to one of the rocks, when a number of frightened ones flew up, and were obliged to struggle hard to reach the shore, owing to the severe wind that prevailed. Their flight was very labored and irregular, and broken by frequent unsuccessful attempts to execute those graceful evolutions which they accomplish with such admirable dexterity and ease at other times; they flew so slowly that they might easily have been overtaken and captured. Besides the present species, there were, also, numbers of Bank Swallows (*Cotyle riparia*), which seemed even more distressed than were the Barn Swallows. It was a sad sight, to see the poor little brown and blue-backed fellows, panting upon the ground after their desperate effort, so reduced by hunger, fatigue and long-continued exposure to the storm. I wished, in vain, that I might relieve their distress; but Nature—more potent than man—came to their aid: the following day broke clear as a bell, and the sun rose warm and bright; and when I visited the pond at sunrise, the Swallows were seen busily engaged in procuring food, and appearing as happy as ever.

Giraud gives the following:<sup>1</sup> "Early in the spring swallows are sometimes so benumbed as to be almost in a lifeless state. This is readily accounted for by the cold storms that set in after their arrival, which also cut off their insect food—at such times they have been found so much exhausted as to be unable to rise, and in some instances have been observed lying dead about the fields." This account brings to mind a circumstance related to me by my father: Many years ago, during a severely unseasonable storm in the spring, numbers of Swallows perished in this region, either through cold or starvation, and were found lying dead upon the barn floors in rows.

*Dimensions*.—Average measurements of eighteen specimens: length, 6·95; stretch, 12·85; wing, 4·67; tail, 3·30; bill from nostril, ·24; gape, ·58; tarsus, ·45; middle toe, ·46; its claw, ·21.

**54. *Tachycineta bicolor*, (Viellot).** WHITE-BELLIED SWALLOW. A summer resident; breeds; abundant during its migrations. Arrives early in April (May 2, 1874; April 30, 1875; 21, 1876, 17, de Nottbeck, at Fishkill; 25, 1877 [shot at Fairfield, Connecticut, on the 7th]; 20, 1878; 22, 1879), remaining till autumn. It breeds in holes, in trees standing in the water, at the borders of ponds and streams.

*Dimensions*.—Average measurements of fifteen specimens: length, 5·90; stretch, 12·66; wing, 4·70; tail, 2·35; bill from nostril, ·22; tarsus, ·45.

**55. *Petrochelidon lunifrons*, (Say).** EAVE SWALLOW; CLIFF SWALLOW. A common summer resident; breeds. Arrives in April (May 22, 1874; April 30, 1875; May 2, 1876; 21, 1877; 9, 1878; April 16, 1879), and spends the summer, departing in September (10, 1876).

This bird of remarkable history breeds in large colonies. It commences nidification early in June. It formerly nested in large communities upon the stone buildings of the West Point Military Academy.

Giraud gives the following account ("The Birds of Long Island," p. 38, 1844) of this species: "The appearance of this Swallow in the lower parts of the State of New York is quite recent. The first that I have known to have been observed in this vicinity, was shot at Manhattanville, in 1842, by Mr. Lawrence. In the month of June of the present year, a few specimens were seen in the suburbs of Brooklyn by Mr. Brasher, and in the latter part of August I met it at Gravesend. Previous to this year, I have no knowledge of its occurring on Long Island; but I should not be surprised if even in a few years it were found quite common. On Long Island I am not aware that the Cliff Swallow has been known to breed; but Mr. Bell has informed me that he found its nest near his residence in Rockland County, in the month of May last—and according to his observations, it had not visited his section previous to the present year."

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<sup>1</sup> Birds of Long Island, p. 36, 1844.

*Dimensions.*—Average measurements of eleven specimens: length, 6·01; stretch, 12·43; wing, 4·34; tail, 2·01; gape, ·62; tarsus, ·50; middle toe, ·53; its claw, ·25.

**56. *Cotyle riparia*, (Linné).** BANK SWALLOW; SAND MARTIN. A common summer resident; breeds. The Bank Swallow makes its appearance here with less regularity than the other Swallows. I have not observed it before May (22, 1874; 27, 1875 [at Niagara Falls]; 21, 1877). It remains till about the first of September (August 27, 1877). It is somewhat local in its habitat in summer. In the month of August immense numbers are found, crowding the telegraph wires along the railroad, where it crosses Constitution Island; it associates with the other species of Swallows, which are then so abundant there that I once brought down no less than three represented genera of Swallows at a single discharge of my gun.

*Dimensions.*—Average measurements of nine specimens: length, 5·20; stretch, 10·85; wing, 3·95; tail, 2·00; bill from nostril, ·18; gape, ·52; tarsus, ·45; middle toe, ·39; its claw, ·21; outer toe, ·26; its claw, ·14.

**57. *Stelgidopteryx serripennis*, (Audubon).** ROUGH-WINGED SWALLOW. A rare summer resident; breeds. As already noted, in the "Bulletin of the Nuttall Ornithological Club," Vol. III, No. I, p. 46, January, 1878, I captured a female of this Carolinian species, sitting upon its four fresh eggs, in May, 1874. The nest was built in a bank, beside a pond; during its construction the birds were often seen to alight close together, on a board-fence, from which they descended after the rough materials of which the nest was composed,—hay and feathers. The eggs were pure white; one of them measures ·80 × ·53 of an inch.

I saw what I thought to be a bird of this species when in company with Mr. C. H. Eagle, on July 4, 1878, near the Cadet camp at West Point. On July 24, 1879, I saw several Rough-winged Swallows upon the telegraph wires, near Constitution Island, and shot one fine specimen.

*Dimensions.*—Measurements of No. 1,967, ♂, July 24, 1879, E. A. M.: length, 5·62; stretch, 12·10; wing, 4·12; tail, 2·05; bill from nostril, ·17; gape, ·55; tarsus, ·43; middle toe, ·39; its claw, ·17; outer toe, ·25; its claw, ·12.

**58. *Progne subis*, (Linné).** PURPLE MARTIN. A summer resident. It formerly bred abundantly in nearly all of the river towns along the Hudson; but it is now much less numerous than it formerly was, having been driven away by those detestable pests—the European Sparrows. I have rarely met with it during its migrations, and have not been able to procure a single specimen. At Highland Falls, I have only seen it on the following occasions: April 9, 1873, and May



26, 1874. I observed a large colony of them at Newburgh, and another at Poughkeepsie, several years ago; but I am informed that their numbers have decreased very much in both cities since the Sparrows became numerous.

Family, **AMPELIDÆ.**

**59. *Ampelis garrulus*, Linné.** BOHEMIAN WAXWING. A rare winter visitant. Dr. F. D. Lente has a very handsome specimen in his collection, which was shot near his residence at Cold Spring, on the Hudson, several years ago, as I have previously recorded, in the "Bulletin of the Nuttall Ornithological Club," Vol. III, No. 1, p. 46, January, 1878.<sup>2</sup> His son, Wm. K. Lente, informed me that he shot at several Bohemian Waxwings that were in an evergreen tree, close to their house. This occurred several years after the first specimen was taken.

This nomadic species is of exceedingly rare occurrence as far south as this latitude, in the Atlantic States. Audubon furnishes the earliest record of its occurrence, which reads as follows:<sup>3</sup> "In the autumn of 1832, whilst rambling near Boston, my sons saw a pair, which they pursued more than an hour, but without success. The most southern locality in which I have known it to be procured, is the neighborhood of Philadelphia, where, as well as on Long Island, several were shot in 1830<sup>4</sup> and 1832." Since that time there have been a few recorded instances of its capture in Southern New England, including Massachusetts and Connecticut. DeKay, in treating of this species, remarks:<sup>5</sup> "The specimen from which our figure was taken, was shot in the autumn of 1835, in the neighborhood of this city [Albany?]."

Dr. Charles C. Abbott, in his "Catalogue of Vertebrate Animals of New Jersey," (p. 774),<sup>6</sup> gives the following notice: "A northern species, that is occasionally shot as far south as New Jersey. The author has seen two specimens, one shot in Cape May County, the other in Morris County."

**60. *Ampelis cedrorum*, (Vieillot).** CEDAR BIRD; CAROLINA WAXWING; CHERRY BIRD. A common, gregarious species; resident, breeding abundantly. This strikingly handsome bird is numerous with us throughout the year; but it is somewhat locally dispersed, and

<sup>2</sup> Dr. Lente has supplied me with the following particulars: "The Bohemian Chatterer referred to was found dead, in Genl. Morris's grounds [Cold Spring], by Mr. Wm. Paulding. I cannot give the year. F. D. Lente."

<sup>3</sup> Ornithological Biography, Vol. IV, p. 463, 1838.

<sup>4</sup> Not 1831, as incorrectly stated by Dr. Coues, in Birds of the Colorado Valley, Part First, p. 465, 1878.

<sup>5</sup> Zoology of New York, Part II, Plate 26, fig. 57, 1844.

<sup>6</sup> Published in Cook's Geology of New Jersey, 1868.



most particularly so in winter. Then I have noticed that large flocks will occupy a very limited area of country, perhaps remaining there for several weeks at a time; and then all suddenly disappear from the place, after which no more Waxwings may be seen for a long period, at that particular spot. These erratic movements are doubtless due, in some cases, to the exhaustion of its food supply; but in general they must be attributed to a roving and eccentric disposition, such as characterizes its distinguished cousin, the Bohemian Waxwing. As has been observed in other wandering species, there is also an element of uncertainty with regard to its season of reproduction. It commonly begins to build its nest early in June (I found two nests, each containing five eggs, on June 12 and 18, 1878), but I have a record of taking its fresh eggs as late as September 11 (1871).

In winter, the Cedar-birds subsist in great measure upon berries, and principally those of the red cedar (*Juniperus virginiana*). From this circumstance, they have acquired their most familiar name of Cedar-birds. In my neighborhood, they get most of their food among the cedars and sumachs, down by the river; but there are some tall maple-trees in front of my house, which seem to possess peculiarly strong attractions for them, so that, as soon as their crops have been comfortably filled, the whole flock flies up to these trees to spend the interval between meals. They are extremely fond of drinking, and bathing, often descending to the gutters upon the roof for the purpose. During rainy days they do not seek any protection from the wet, but sit quietly, most of the time, with top-knots flattened, looking just a trifle depressed in spirits, as well as literally crest-fallen. They rid their silky plumage of rain-drops by occasional, vigorous shakes; and sometimes a restless individual will fly out in a circle, for exercise or diversion, returning again to the same twig which it left. A flock that is thus quietly settled can be conveniently examined, and a careful inspection will show that, although the birds form a somewhat compact group, there is a division, more or less distinct, into separate couples—the birds sitting in twos. This distribution, in pairs, is most apparent upon the border of the flock, where their numbers are least. I have repeatedly selected a couple, and shot both birds at once: they invariably proved to be of opposite sexes. As this occurred in winter, I infer, either that the species is in the habit of mating at a very early season, or, else, that their connubial attachment is of long duration. I append the following note from my journal: "March 24, 1879. A flock of Cedar-birds remained in the trees about the house all of to-day. I observed that they separated into pairs; and they are probably mated already. Two would separate themselves from the mass of their brethren, and edge towards each other, making alternate advances, and, at last, applying their bills together, doubtless as a means of caressing."

We are especially indebted to the Cedar birds for the part that they have taken in destroying the insect-pest, which for several years past has carried such wide-spread havoc among the elm-trees of this region.<sup>7</sup> During the summer months every tree of this genus (*Ulmus*) bears the evidence of ravages committed by this noxious insect, whose devastating action is evidenced by the blighted foliage. Early in the season, in some cases, the trees are completely denuded of their leaves, which reappear again, late in autumn, just before the frosts come to destroy them a second time. Energetic measures have been adopted for the preservation of those trees which are desired for shade, or ornamental purposes; and various devices have been resorted to, to destroy this troublesome insect. None of these efforts have, however, been crowned with a large measure of success. The Cedar-birds have accomplished far more towards its extirpation than have all other causes combined. Frequenting the elms where this insect abounds, the Waxwings devour immense numbers, not only of the winged insect, but also of the larvæ. They capture the adult insects upon the wing, in the manner of the Flycatchers, and eagerly search the trunk and branches for their crawling larvæ, which are swallowed with the greatest avidity.

In the Nuttall Bulletin (Vol. III, No. 2, pp. 70 and 71, April, 1878), I have described certain minor variations in color, and in the ornamentation of the wings and tail, in high conditions of this species. They have attracted the attention of various writers (especially Baird, Coues and Brewster), who have described the usual differences. These consist, in the presence or absence of yellow or white spots upon the extremity of the remiges, and in the distribution of the red wax-like appendages which adorn the tips of the quills. The yellow or white spots on the remiges, when present, are confined to the primary quills. They are only present in a few cases, and are usually of small size, though occasionally as distinct as are those of the recitrices. They may be entirely white, entirely yellow, or a mixture of both colors. In the latter case, there is either a proximal band of white, succeeded by a yellow one that blends with the first; or they may be as described by Mr. Brewster,<sup>8</sup> "tipped broadly with white, and in the centre of each white spot a smaller one of yellow." I have recently seen several examples having distinct yellow tips to a few primary quills. The red horny appendages, which are usually confined to the tips of the secondary remiges, have also been found upon

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<sup>7</sup>An entomological friend, to whom I sent some of the animals in question, informs me that it is *Diabrotica* (*Galleruca*) *calmariensis*; but, here, we call them "elm-flies."

<sup>8</sup>Bulletin of the Nuttall Ornithological Club, Vol. III, No. 2, p. 64, April, 1878.

several primaries, each of the rectrices, and, in one specimen, upon the longest feather of the lower tail-coverts. Mr. George N. Lawrence also states:<sup>9</sup> "I have noticed some peculiarities in color of the wax-like appendages on the wings; in a specimen, presented by Mr. Chas. Galbraith, they are of a light pink, the plumage is as usual except that the ends of the tail-feathers are very pale; another in Mr. Bell's possession had these appendages yellow." These are the variations from the type. In young birds, the yellow band at the extremity of the tail is reduced to a mere trace. In certain stages, only the distal border is yellow, the rest of the band being white. One specimen (No. 1,843, ♀ ad., April 2, 1879, Highland Falls, N. Y., E. A. M.) has the tail very slightly bordered with red, at the extremity, beyond the yellow band.

*Dimensions.* — Average measurements of sixty-three specimens: length, 7·19; stretch, 11·77; wing, 3·70; tail, 2·37; culmen, ·41; bill from nostril, ·26; gape, ·71; tarsus, ·66; middle toe, ·59; its claw, ·25.

#### Family, VIREONIDÆ.

**61. Vireo olivaceus, (Linné).** RED-EYED VIREO. An abundant summer resident; breeds. Arrives from the South in May (18, 1873; 12, 1874; 20, 1875; 16, 1876; 16, 1877; 4, 1878; 10, 1879), staying until October (8, 1874; 4, 1876).

Four species of this genus pass the summer in the Highlands, and breed. All of them build pendulous nests, attached by the brim to the fork of a bush or tree; but none are so abundant, or so universally recognized and admired, as are the Red-eyed Vireos. Soon after their arrival from the South, they commence nesting. I have noted in my journal the discovery of freshly-completed nests, on May 22, 1877; 24, 1878: also of complete suites of eggs, taken June 2, 1876; May 29, 1877; 28, 1878. Their nests are very neat structures, composed of various pliable materials compactly woven together, and lined inside with fibres of inner bark. Pieces of paper are frequently pasted all over the outer surface, making a very enduring wall. Vireos' nests are favorite receptacles for the parasitical eggs of the Cowbird (*Molothrus ater*). Their loud song and confiding manners make the Red-eyes very agreeable inhabitants of our groves and orchards, and serve to reveal their presence to persons not initiated into the mysteries of ornithological science.

*Dimensions.* — Average measurements of eighteen specimens: length, 6·23; stretch, 10·17; wing, 3·20; tail, 2·20; culmen, ·52; gape, ·75; tarsus, ·70; middle toe, ·40; its claw, ·20.

**62. Vireo gilvus, (Vieillot).** WARBLING VIREO. A summer resi-

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<sup>9</sup>Ann. Lyc. Nat. Hist., Vol. VIII, p. 285, April, 1866.



dent; breeds; very much less numerous than the preceding species. Arrives early in May (20, 1875; 7, 1876; 9, 1877; 9, 1878; 8, 1879), and remains till autumn.

*Dimensions* —Average measurements of six specimens: length, 5·80; stretch, 9·07; wing, 2·85; tail, 2·14; culmen, ·46; bill from nostril, ·30; gape, ·68; tarsus, ·72.

**63. Vireo philadelphicus, (Cassin).** BROTHERLY-LOVE VIREO; PHILADELPHIA GREENLET. In the "Bulletin of the Nuttall Ornithological Club," Vol. III, No. 1, p. 46, January, 1878, I recorded the capture of the first Brotherly-love Greenlet in this State as follows: "I have a single male specimen of this scarce species in my collection, taken near here. It was shot by my friend, Mr. William K. Lente, at Cold Spring, as it hopped about in a tree-top, September 24, 1875. This example exhibits the intensity of yellow color on the under parts which characterizes the *autumnal plumage*." Mr. Frank R. Rathbun, in his "Revised List of Birds of Central New York," p. 16, April 17th, 1879, states that it is "found regularly in the Spring migrations." The species was not mentioned in the original "Rathbun-Fowler List," published in the "Auburn Daily Advertiser" of August 14, 1877. From information lately received, I am able to predict that additional captures, in other parts of New York, will be recorded ere long.

*Dimensions.*—Measurements of my specimen: [length, 4·75; stretch, 7·62. W. K. Lente] wing, 2·52; tail, 1·93; culmen, ·39; bill from nostril, ·28; gape, ·57; tarsus, ·65.

**64. Vireo flavifrons, Vieillot.** YELLOW-THROATED VIREO; YELLOW-THROATED GREENLET. A summer resident; breeds. Most numerous during the spring and fall migrations. Arrives early in May (15, 1874; 16, 1875; 8, 1876; 12, 1877; April 27, 1878, W. C. Osborn), remaining till about the first of October (September 19, 1874).

The Yellow-throated Vireo is a noisy, chattering species, capable of producing a very fair musical entertainment when so disposed. Its nest, very similar to that of *olivaceus*, is built the last of May, or early in June. I caught a male bird, sitting upon two fresh eggs, as early as May 25 (1874). In the spring, when this pretty species is abundant, it passes through in straggling bands of some size.

*Dimensions.*—Average measurements of twelve specimens: length, 5·95; stretch, 9·78; wing, 3·05; tail, 2·10; bill from nostril, ·36; gape, ·72; tarsus, ·76; middle toe, ·47; its claw, ·20.

**65. Vireo solitarius, (Wilson).** SOLITARY VIREO; BLUE-HEADED VIREO. A common spring and fall migrant. Arrives about the first of May (9, 1876; April 23, 1877; May 13, 1878; 8, 1879), and passes through before June (seen May 24, 1876; 18, 1877). In autumn, it passes through during September and the first part of October. It is frequently seen associated in good-sized flocks. I have seen a splen-



did exhibition of courage on the part of this plucky little bird, when disabled by a wound. It flew at me, when I attempted to catch it, and used both beak and claws with all its might.

*Dimensions.*—Average measurements of fourteen specimens: length, 5·61; stretch, 9·42; wing, 2·96; tail, 2·15; culmen, ·41; bill from nostril, ·28; gape, ·64; tarsus, ·73; middle toe, ·44; its claw, ·21.

**66. Vireo noveboracensis, (Gmelin).** WHITE-EYED VIREO; "POLITICIAN." An abundant summer resident; breeds. Arrives early in May (14, 1875; 17, 1876; 21, 1877; 4, 1878; 12, 1879), and remains till autumn.

This handsome species is an inhabitant of swampy thickets. For a very pleasant and amusing account of its habits, I would refer the reader to John Burroughs' chapter on "The Return of the Birds,"<sup>10</sup> which he wrote when residing in the Highlands. The name of "Politician," given above, was first used by Wilson, who says:<sup>11</sup> Outwardly its nest "is constructed of various light materials, bits of rotten wood, fibres of dry stalks of weeds, pieces of paper, commonly newspapers, an article almost always found about its nest, so that some of my friends have given it the name of the *Politician*." I have observed the habit of using newspapers for the construction of nests, in the Red-eyed Vireo; but, in this region, the White-eyed Vireo usually repairs to remote swamps to breed, where newspaper literature is rarely encountered. It displays a high degree of architectural skill, however, in all cases. I have found a nest, in which the eggs were already being incubated, as early as May 28 (1877). The male sings a sweet, and curious song, while his mate is sitting upon her eggs; and he displays great uneasiness whenever the nest is approached. The female, like the rest of the Vireos, is a very close sitter, and I have taken her off the nest, before she could be induced to leave it. On such occasions she is very pugnacious; and, on being released, instead of making good her escape, she comes back and scolds one most vigorously, in a tone resembling that of an irate Catbird. I have visited its nest in the evening, and found the mother sleeping soundly, breathing hard, and with her head tucked under the feathers. The nest is fastened to a forked branch, within a few feet of the ground; commonly a laurel (*Kalmia*) is selected.

*Dimensions.*—Average measurements of five specimens: length, 5·27; stretch, 7·85; wing, 2·37; tail, 1·95; culmen, ·42; bill from nostril, ·29; gape, ·65; tarsus, 70; middle toe, ·62; its claw, ·18.

#### Family, **LANIIDÆ.**

**67. Lanius borealis, Vieillot.** GREAT NORTHERN SHRIKE; BUTCHER-BIRD. A winter visitant; occasionally somewhat numerous. It

<sup>10</sup>Wake-Robin, Chapter I, 1871.

<sup>11</sup>American Ornithology, Vol. II, p. 166, 1810.

appears from the North about the first of November (16, 1874; 9, 1878 [W. C. Osborn]), and retires about the first of April (March 31, 1873, 28, 1877). I have witnessed many deeds of daring on the part of this remarkably handsome, though bloodthirsty bird; but its temerity and rapacious exploits have been so often described, that I will only mention one occurrence—the last noted in my journal: “When walking upon the Railroad, near Garrisons, I started a Snowbird (*Junco hyemalis*) from the track, a few paces in advance. A Shrike instantly dashed down from the ledge above in hot pursuit. The Snowbird made every effort to escape, doubling and twisting, and crying most piteously as it endeavored to elude its adversary by dashing into a clump of hemlocks that seemed to offer protection; but the Butcher-bird followed closely all of its windings, till at last the terrified creature flew on top of the ledge, followed closely by its enemy. I did not witness the result, but have no doubt that it ended in a tragedy.” Such incidents are familiar to all who have made the Shrike’s acquaintance; and, very likely, it was on just such an occasion that the reader was first introduced to this fierce little butcher, who is so devoid of fear of man, when in quest of game.

*Dimensions*.—Average measurements of three females: length, 10·07; stretch, 14·05; wing, 4·41; tail, 3·43; culmen, ·71; bill from nostril, ·55; gape, 1·10; tarsus, 1·03; middle toe, ·61; its claw, ·28.

#### Family, **FRINGILLIDÆ.**

**68. *Pinicola enucleator*, var. *canadensis*, (Brisson). PINE GROSBEAK.** An irregular winter visitant; sometimes abundant.

This beautiful species wanders southward at irregular intervals, and only visits us during the coldest winter weather. It usually appears in large flocks, which are composed principally of females and young birds. The red males are seldom seen. I first saw the Pine Grosbeak on November 22, 1874, when a large flock alighted upon a Norway spruce (*Abies excelsa*) before my house, and commenced to feed upon the seeds of the cones. *All were adult males*, and presented a very beautiful appearance. The species was not again met with until the first of December, when large numbers were present. It continued to be plentiful until the following March; and some stayed as late as March 25. The males in red plumage were not more than two per cent. of any of the numerous flocks that I examined during the winter, with the single exception of the one first seen, which, singularly enough, was composed *entirely* of old males.

During the winter of 1875–76, Pine Grosbeaks were seen twice. I saw two flying over Iona Island, on December 11, 1875; and, on January 12, 1876, I shot three specimens from a small flock found feeding upon sumach berries and seeds of hemlock spruce (*Abies canadensis*), near Fort Montgomery.

I next came across them on the morning of November 29, 1878. A flock was found in an orchard feeding upon seeds of apples, both on the trees and upon the ground. My gardener, near whose house they were, informed me that they had spent several days there, previous to my arrival at home. I first heard their call-note, and, on looking about, saw them gleaning upon the ground close at hand. When shot at, they uttered a mournful cry, and, sometimes, while feeding, a high note resembling that of the Purple Finch (*Carpodacus purpureus*). This flock stayed in the orchard until I left home, on December 2. They were very quiet, gentle in their manners, and so unobtrusive, that they might easily have been passed by without notice. When rudely frightened, they would fly to the nearest tree, and there sit motionless for a short time; then they dropped silently to the ground, and resumed their avocations in silence. These birds seemed contented, and not in the least restless. I encountered several other flocks during my brief stay; and nothing was more remarkable than the amount of silence they preserved, considering the large preponderance of *females* present. Some were so tame that they could have been readily captured by means of a noose or hand-net. No adult males were seen, though I secured an immature specimen that was about one-half red; another example was in the dullest plumage, so that, before skinning, I supposed it to be a female, but a careful dissection showed that it was masculine. Some were moulting their tail-feathers. Several specimens taken had a few of the outer rectrices only an inch or two long; these were always the outer ones, and only on one side.

I saw a Pine Grosbeak in the Central Park, New York City, on December 20, 1878.

Dr. Clinton L. Bagg saw five Grosbeaks, among them a fine red male, near West Point, N. Y., on December 29, 1878; they were picking at some decayed apples by the wayside. We saw several females, near the same place, on the following day.

The Pine Grosbeak's song is one of the finest, but I have only been privileged to listen to it on a single occasion—in March, 1875. The weather at the time was intensely cold. The preceding winter had been one of unusual severity; and the ice was still many inches thick upon the Hudson. The Purple Finches, though present, seldom felt inclined to sing; and the few hardy Song Sparrows that had braved the winter were ensconced in cosy nooks among the flags, behind some sheltering ledge of rock, where, only on the warmest days, they made abortive attempts at a song. These were the only performers except an occasional Red Crossbill; and bird music was rare indeed. It was one frosty morning, as I was following the course of a stream that flowed at the bottom of a deep ravine, that I heard, most unexpectedly, a new song. It proceeded from far up the glen. The notes



were loud, rich and sweet. I listened to them with a thrill of delight and wonder, and then pressed forward to identify the new vocalist. Soon I discovered perched upon the top of a tall hemlock, a beautiful red Pine Grosbeak—the author of one of the most delicious songs that I have ever heard. Its carmine or rose-colored plumage, and its mellow notes, were a feast alike to the eye and ear; and, though I may never hear the Pine Grosbeak sing again, I shall ever cherish towards it feelings of admiration and gratitude for the revelation of beauty and melody which I so keenly appreciated on that occasion. We cannot but wish that this Grosbeak was a more frequent sojourner with us; for its bright hues would add life and color to our sombre winter scenery, and its fine song would afford us much enjoyment.

Except the Red Crossbill (*Loxia curvirostra*, var. *americana*), there are no birds so gentle as the present species. They appear to be utterly devoid of fear of man. If their ranks are thinned by the gunner, the survivors will rarely be driven away, but come close up to the hunter and hop from branch to branch in his vicinity, scrutinizing him closely and uttering a reproachful note like that of the Fox Sparrow (*Passerella iliaca*); they often fly down to inspect the dead bodies of their comrades lying upon the ground. Their flight is floating and graceful. They eat seeds of coniferous trees, and of various weeds that grow in pastures or by the wayside. They search in orchards for decayed apples, and eagerly extract the seeds; but the seeds of maple, and berries of red cedar, are their staple articles of food. They also eat other kinds of berries and buds. Wherever there is a supply of good water they congregate; for they are extravagantly fond of bathing.

Wilson had a Grosbeak that was procured in the Highlands, upon which he made the following interesting observations:<sup>12</sup> "I have kept one of these Pine Grosbeaks, a male, for more than half a year. In the month of August those parts of the plumage which were red became of a greenish yellow, and continue so still. In May and June its song, though not so loud as some birds of its size, was extremely clear, mellow and sweet. It would warble out this for a whole morning together, and acquired several of the notes of a Red-bird (*L. cardinalis*), that hung near it. It is exceedingly tame and familiar, and when it wants food or water utters a continual melancholy and anxious note. It was caught in winter near the North river, thirty or forty miles above New York."

Since Wilson's time, the Pine Grosbeak has been found in the Hudson Valley by various writers—among them Giraud, DeKay and Lawrence. The former author wrote:<sup>13</sup> "In the autumn of 1827,

<sup>12</sup> American Ornithology, Vol. I, p. 82, 1808.

<sup>13</sup> Birds of Long Island, p. 129, 1844.



large flocks of Pine Grosbeaks visited Long Island, Hoboken, and various places in the lower parts of New Jersey and New York. Since that period until the present year, I have not seen or heard of its occurring on Long Island. In the interval, a few have been observed in Rockland County, in which section, as with us, it was quite common during the month of January of the present year [1844] . . . . Although large numbers were during the winter observed in the vicinity of New York, very few adults were procured."

*Dimensions.* — Average measurements of sixty-two specimens:—length, 9·08; stretch, 13·90; wing, 4·36; tail, 3·67; culmen, ·54; bill from nostril, ·43; gape, ·60; tarsus, ·88; middle toe, ·63; its claw, ·35.

**69. *Carpodacus purpureus*, (Gmelin).** PURPLE FINCH. A permanent resident; breeds. Though not very numerous in summer, a few commonly nest near my house, building in the tops of tall cedars or Norway spruces. Mr. William K. Lente found its nest at Cold Spring, in 1874. Mr. R. F. Pearsall found a nest at Bayside, Long Island, on June 15, 1878; he thinks that it is "the most southern point at which the species has been found breeding."<sup>14</sup>

These handsome birds are generally abundant in winter. Their song, which is loud and sweet, is indulged in by both sexes throughout the autumn and winter, as well as during the love season. Females are heard to sing, in winter, as commonly as the males. Adult males, in winter, are sometimes very scarce, though the opposite sex is well represented; this is frequently as marked as was the case with the Pine Grosbeak and Lesser Redpoll, in the early part of the winter of 1874-75. They are gregarious, often assembling in very large flocks. On some occasions they are quite wild, and, on being approached, all rise at once on wing with a loud, rushing noise, accompanied by certain peculiar wild notes, which produces quite a startling effect. They feed upon seeds of the iron-wood (*Ostrya virginica*), and red cedar berries. When feeding in flocks, the rustle of their wings is constant, and their united chirping produces a singular effect. Their whirring flight and chattering notes remind one of the flight of flocks of House Sparrows. I have found immense flocks in March, eating the seeds of hemlock spruce (*Abies canadensis*).

The great bulk of this species passes north during the spring migration. As usual in general migrations, the males precede their partners by several days. At that season they often frequent ploughed fields, in company with the Rose-breasted Grosbeaks and Indigo Birds, where they do some damage by picking up the newly-sown grain. Like the Blue Jay and some other birds, they appear to be unusually lively during a rain-storm; and, in winter, at the commencement of a snow-storm, they sometimes hie to the loftiest tree-top,

<sup>14</sup> See Bulletin of the Nuttall Ornithological Club, Vol. IV, p. 122, April, 1879.

and begin to sing, as if from pleasure or excitement. They destroy young buds, and, together with the Rose-breasted Grosbeak, eat large quantities of the stamens and petals of cherry and apple blossoms. In April, blossoms of the maple are eaten. Females in high condition, like those of the Pine Grosbeak, sometimes have a distinct red suffusion over the plumage.

In his "Revised List of Birds of Central New York," Mr. Rathbun gives, concerning this species, the following: "An abundant summer resident. Arrives in March—March 9, 1878. Common the second week in April. Breeds. Departs in October." I think that it will in time be found there, at least occasionally, in winter; for I saw a few at Locust Grove, in Lewis County, N. Y., during the last of December and first of January, 1877-78.

*Dimensions.*—Average measurements of thirty-eight specimens: length, 6.22; stretch, 10.16; wing, 3.24; tail, 2.29; culmen, .46; gape, .58; tarsus, .68; middle toe, .53; its claw, .19.

**70. *Loxia leucoptera*, Gmelin.** WHITE-WINGED CROSSBILL. An occasional visitor from the North.

Early in the winter of 1874-75, these birds appeared sparingly near Cold Spring, where Mr. William K. Lente saw them first, in the early part of December, soon after the Pine Grosbeaks became numerous. Mr. Frederic S. Osborn found them quite common during the winter, at Garrisons; the earliest record of its occurrence noted in his journal being December 28, 1874. I did not meet with any before January 14, 1875, when I found an immense flock near Fort Montgomery, in a dark grove of hemlocks. They were in company, but not mixing, with flocks of Red Crossbills (*Loxia curvirostra*, var. *americana*). As they flew from tree to tree, they uttered a loud, rattling cry; and they were far shyer than the Common Crossbill. After this the species was frequently seen in different-sized flocks, and remained until March 10, when they were in full song. Their flight is strong and swift; and they are so active and noisy, that a flock of a dozen makes a tree appear as if filled with them. In spite of an apparently malformed bill, their song is one of remarkable beauty.

Wilson found a few White-winged Crossbills in the great pine forests of Pennsylvania; and Bonaparte, in his "American Ornithology" (Vol. II, p. 276, 1828), furnishes the following: "During four years it had escaped my careful attention, and now writing (in the first week of November, 1827) they are so abundant, that I am able to shoot every day great numbers out of flocks that are continually alighting in a copse of Jersey scrub-pine (*Pinus inops*), even opposite my window." Giraud observes:<sup>15</sup> "In this locality [Long Island]

<sup>15</sup> Birds of Long Island, p. 131, 1844.

this species is not as frequently observed as the preceding [*L. curvirostra*, var. *americana*], in the general habits of which it resembles. Like the former, it prefers the northern part of the continent, and only resorts to our milder climate when driven by severe weather."

*Dimensions*.—Average measurements of ten specimens: length, 6.05; stretch, 10.18; wing, 3.27; tail, 2.41; culmen, .62; tarsus, .61.

**71. *Loxia curvirostra*, var. *americana*, (Wilson).** AMERICAN RED CROSSBILL. An occasional visitor, usually in winter; sometimes abundant.

Red Crossbills were extremely common during the winter of 1874-5. They were first seen in December, by my friend, the late Frederic S. Osborn. I found three birds feeding on the seeds of pitch pines' cones (*Pinus rigida*) on January 11. After that they were seen commonly, and continued to be abundant until the 10th of April, at which time they were singing very sweetly. The Red Crossbills are surprisingly gentle, not in the least objecting to being approached to within a few feet. I used frequently to visit a certain dense grove of hemlocks (*Abies canadensis*), that was constantly inhabited by large flocks of Crossbills of both species, for the purpose of watching their singular habits. The White-wings were somewhat shy and suspicious, and extremely restless, constantly flying from the top of one tree to that of another, and keeping up an incessant rattling cry; but the Red Crossbills were found in larger numbers frequenting the lower drooping branches, to which they clung in every variety of posture, gleaning busily the while, seldom roving about, and inclined to be noisy and chattering, though their notes are very unlike those of the other species, and more nearly resemble those of the European Sparrow. Their dexterity in extracting the seeds from cones is quite remarkable, and the shower of refuse materials sent down from a tree-top, is, of itself, sufficient to apprise one of their presence.

The nest of this Crossbill was found at Riverdale, N. Y., by Mr. Bicknell, and contained three eggs on April 30, 1875.<sup>16</sup> Riverdale is on the Hudson River, sixteen miles north of New York Bay. For a very interesting account of the Red Crossbill at Riverdale, see Mr. Eugene P. Bicknell's article, in the "Nuttall Club Bulletin" for January, 1880, pp. 7 to 11.

I saw a large flock of Crossbills at Fort Miller, Washington County, N. Y., on February 27, 1877.

*Dimensions*.—Average measurements of eighteen specimens: length, 6.19; stretch, 10.72; wing, 3.40; tail, 2.13; culmen, .66; tarsus, .62.

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<sup>16</sup> American Naturalist, Vol. X, No. 4, p. 237, April, 1876.

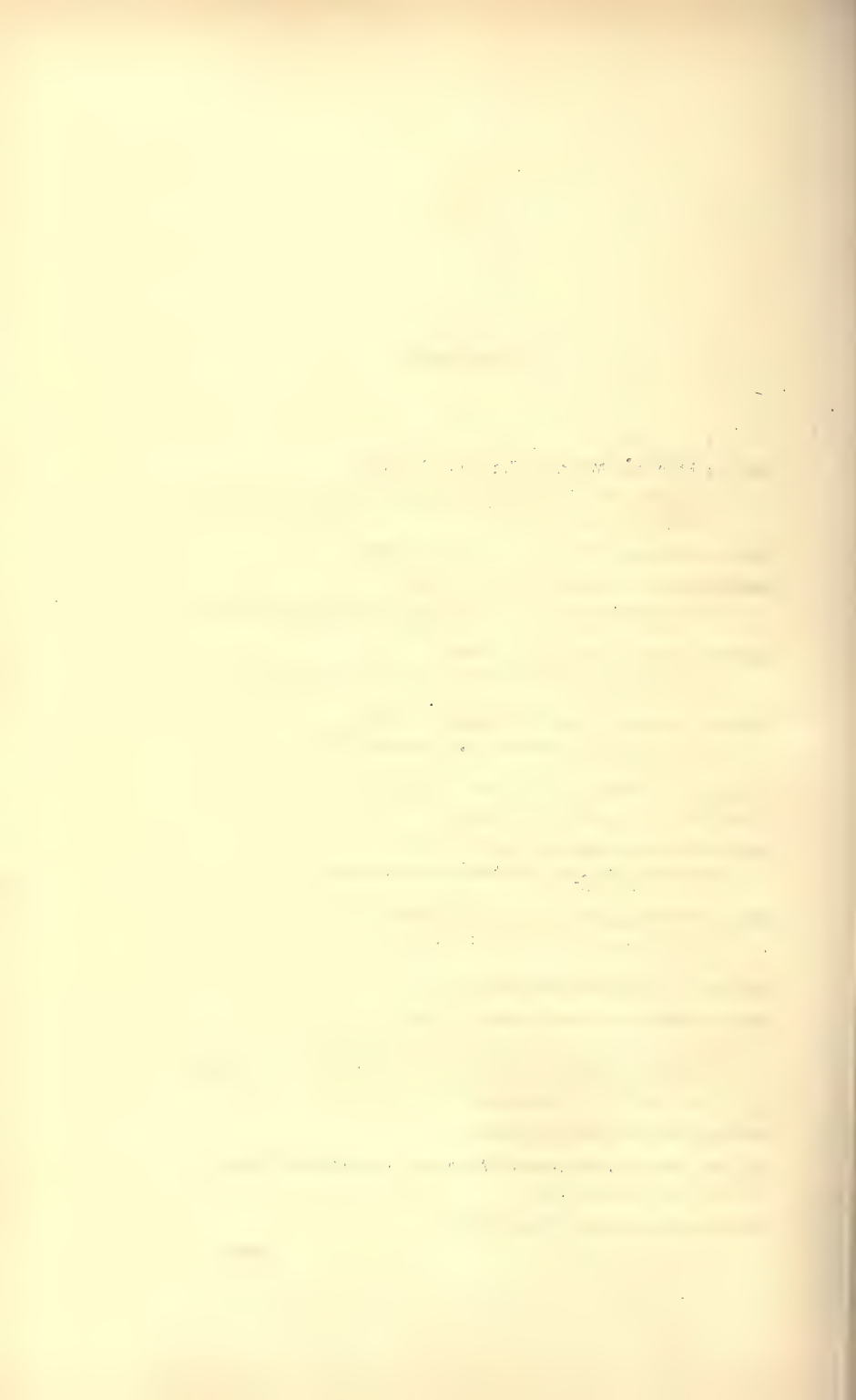
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# BULLETIN

OF THE

## ESSEX INSTITUTE.

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REGULAR MEETING, MONDAY, JAN'Y 19, 1880.

MEETING this evening. PRESIDENT in the chair. Records read. Donations and correspondence announced.

Mrs. Margaret Braden and Arthur West, both of Salem, were elected resident members.

Vice President, D. B. HAGAR, read a paper on "*Spelling Reform*." He commenced by saying that it was too late for sensible men to laugh at the spelling reform. He named a large number of eminent scholars in England and in America who are its advocates, and designated prominent educational bodies who have officially favored its consideration. He alluded to several well known leading newspapers as having adopted some of the proposed new spelling, mentioning the *Chicago Tribune*, the *Utica Herald*, the *N. Y. Independent*, the *Journal of Education* and the *Home Journal*, and stated what had been done by educational associations in behalf of the reform. The following propositions were then advocated :

- (1) That spoken language necessarily precedes written



language. (2) That the grand purpose of written language is to represent to the eye the spoken language, as heard by the ear. (3) That the written language should be so constructed that the transition from the spoken to the written, and, conversely, from the written to the spoken, should be simple, uniform, and truthful. (4) That, to this end, a phonetic system is the most direct, easy, and rational. (5) That in devising a written language for a people hitherto without one, no sensible scholar would, at the present day, think of framing it on any principle other than the phonetic. (6) That the present orthography of the English language is so lawless, so perplexing, so confounding to all rational expectation, that the learner is compelled, from first to last, to guess at the pronunciation of every new word he sees; that he cannot be certain of correctness until assured by his teachers, and possibly not even then.

Under this last point, numerous illustrations of irregularity and inconsistency in English spelling were given. It was shown that the present orthography of the English language employs sixty-two signs, which have at least one hundred and fifty-nine uses; whereas a pure phonetic system would, therefore, save a vast amount of time in learning to read and spell.

Mr. Hagar then proceeded to answer the objections usually urged against a reform of English orthography, endeavoring to show that they were of little importance.

The paper closed by answering the question, What can be done toward accomplishing the desired reform? Something could be done in the following ways: (1) By the general discussion of the subject among teachers and other friends of education. (2) By establishing spelling-reform associations throughout the country. (3) By concert of action among State and County educational

associations. (4) By procuring the appointment of National and State Commissions to consider and report on the subject. (5) By personally adopting in our correspondence the spellings recommended by the American Philological Association. (6) By freely using the public press toward setting before the public the objects and merits of the proposed reform. (7) *By teaching the children in the public schools to read from a phonetic text.* (8) By cherishing the pluck and aggressiveness of earnest reformers.

Prof. E. S. MORSE spoke of the Japanese language, showing that students there had to surmount even greater obstacles than obtain in the present English system.

Mr. JAMES KIMBALL exhibited and explained Wilson's Ozone Generator and Diffuser. This apparatus is intended to be used in destroying the impurities in the air of close and poorly ventilated rooms, also the noxious emanations produced by the decomposition of animal and vegetable substances. It is a machine holding six small cups partly filled with water, a stick of prepared phosphorus being placed in each cup. Upon the ignition of the phosphorus a cover of porous porcelain is placed over the cups and the apparatus is prepared to do its work.



REGULAR MEETING, MONDAY, FEBRUARY 16, 1880.

PRESIDENT in the chair. Records read. Donations and correspondence announced.

At an adjournment on Tuesday, Feb. 17, Charles Toppan, of Salem, was elected a member.

The Secretary read a communication from the American Academy of Arts and Sciences, inviting the Essex Institute to select one or more delegates to attend the celebration of its 100th anniversary to be held in Boston on the 26th of May, 1880.

On motion of Mr. F. W. Putnam, the selection of delegates was referred to a committee, consisting of the President and Secretary.

A similar invitation was read from the Minnesota Historical Society, which will celebrate the 200th anniversary of the discovery of the Falls of St. Anthony, on the 3rd day of July, 1880, to send a representative on that occasion. The subject was referred to the same committee with power to act.



#### REGULAR MEETING, MONDAY, MARCH 1, 1880.

MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Vice President F. W. PUTNAM made a communication of peculiar interest, but of which only a brief abstract of some portions is here given. His subject was "The former Indians of Southern California, as bearing on the origin of the Red Man in America."

After giving an account of the discovery of the Peninsula of California, in 1534, by an expedition fitted out by Cortés, he gave an historical résumé of the military expeditions to Upper California, the establishment of the missions by the Jesuits and Franciscans, and of their degrading influence on the Indians.

He then called attention to the facts relating to the antiquity of man on the Pacific coast, and to the importance

of the discovery in California of human remains and of the works of man under beds of volcanic material, where they were associated with the remains of extinct post-pliocene animals, and to the necessity of looking to this early race for much that it seems otherwise impossible to account. He thought that what is called the "Eskimo element," in the physical characters and arts of the southern Californians, was very likely due to the impress from a primitive American stock, which is probably to be found now in its purest continuation in the Innuvit. In this connection he dwelt upon the probability of more than one type of man. In following out this argument, he called attention to the distinctive characters in different tribes of Indians on the Pacific coast, and stated his belief that they had resulted from an admixture of the descendants of different stocks. The Californians of three hundred years ago, he thought, were the result of development by contact of tribe with tribe through an immense period of time, and that the primitive race of America, which was as likely autochthonous and of pliocene age, as of Asiatic origin, had stamped its impress on the people of California. The early races of America he believed were dolichocephali, and the short-headed people he thought were made up of a succession of intrusive tribes in a higher stage of development, which in time overran the greater part of both North and South America, conquering and absorbing the long-headed people, or driving them to the least desirable parts of the continent. He thought that the evidence was conclusive that California had been the meeting ground of many distinct tribes of the widely spread Mongoloid stock; for in no other way could he account for the remarkable commingling of customs, arts and languages, and the formation of the large number of petty tribes



that existed in both Upper and Lower California when first known to the Spaniards.

The speaker then gave a review of the arts of the Californians and the physical characters and customs of the people, showing that, notwithstanding the absence of pottery, the tribes, when first known, had passed through the several stages of savagery and had reached the lower status of barbarism, as defined by Mr. L. H. Morgan in his "Ethnical periods."

Mr. Putnam concluded by calling attention to the recent explorations of the coast of southern California and the adjacent islands, by the expedition under Lieut. Geo. M. Wheeler of the U. S. Engineers, in charge of the Survey West of the 100th Meridian, and the extended explorations of the Santa Barbara Islands which had been conducted by the Peabody Museum of Archæology at Cambridge. The results of these explorations, he stated, were now embodied in the seventh volume of the Reports of the Survey under the charge of Lieut. Wheeler, and published, by authority of Congress, under the direction of the Chief of Engineers, U. S. A.



FRIDAY, MARCH 11, 1880.

MEETING this evening. The PRESIDENT in the chair.

Rev. ROBERT COLLYER, of New York, read an interesting paper entitled "An Episode in the life of Edward Fairfax."

The PRESIDENT, before introducing the lecturer of the evening, briefly alluded to William Fairfax, a lineal de-

scendant of Thomas, the first Lord Fairfax, who was an elder brother of Edward, an episode in whose life is the subject of the paper under consideration. William Fairfax was the son of Hon. Henry Fairfax, sheriff of Yorkshire, who was the son of Henry, the fourth Lord Fairfax. Having received the appointment of collector of the port of Salem, he came to Salem in 1725 from the Bahamas, where he had married Sarah, daughter of Major Walker, and was appointed Chief Justice of the Island. His wife died in Salem in 1731, and subsequently he married Deborah, daughter of Francis and Deborah (Gedney) Clarke. In 1734 he accepted an offer from his cousin Thomas, the sixth Lord Fairfax, to be the superintendent of the estates in Virginia, which he had inherited from his mother, who was a daughter of Lord Culpepper. He then removed thither and took up his residence first in Westmoreland County, but subsequently removed to a plantation called Belvoir, near Alexandria.

During his residence in Salem he occupied the house which was taken down some eight years since, on the western corner of Essex and Cambridge streets, for the erection on the site of a more eligible mansion. The house was then owned by Philip English, or his daughter Susannah Touzel.

For a more extended notice of the Clarke Family and its connection with the Fairfax, the reader is referred to a notice of the Clarke and Gedney families, prepared by H. F. Waters, and printed in the Historical Collections of the Essex Institute, Vol. XVI, part 4.

Mr. COLLYER gave at first a very graphic account of the ancient seat of the Fairfax family at Denton Park in Yorkshire. He spoke of several of the members of the family, particularly Thomas, the third Lord Fairfax,

who was the great General of the Parliament Army, 1645 to 1650—born in Denton, 17 Jan'y, 1611-12, died at Belburgh, near York, 12 Nov., 1671, and Thomas the sixth Lord Fairfax who resided for many years on his estates in Virginia and was the intimate friend and patron of Washington and who died at Greenway Court near Winchester, Va., in 1781, aged ninety-one years.

Edward Fairfax, the poet, born at Denton, Yorkshire, and died in the Parish of Fewston about 1631. The consideration of his writings was the leading and principal topic discussed in this communication. He seems to have preferred a life of study and retirement to that of military service in which his brothers and other members of the family were distinguished. Having married he lived at Fewston and there spent his time in literary pursuits. His best known production is a translation of Tasso's poem of "Jerusalem Delivered," which appeared in 1600 and was received with enthusiastic and continued approbation. Its popularity has revived in the present century and several editions have appeared in England and the United States. His work on demonology entitled "A Discourse of Witchcraft, as it was acted in the family of Mr. Edward Fairfax of Fewston, in the county of York, in the year 1621," was particularly noticed and fully explained, giving a very interesting and instructive sketch of the condition of witchcraft at that period.

Edward Fairfax was a firm believer in witchcraft. He imagined that some of his children had been bewitched; and he had some of the witches brought to trial, though without obtaining a conviction. He, however, only shared in the common superstitions of the age and was settled in the conscience of having the sure ground of God's word to warrant all he believed, and the commendable ordinances of the English church to approve all he practised.

## REGULAR MEETING, MONDAY, MARCH 15, 1880.

REGULAR MEETING this evening. PRESIDENT in the chair. Records read. Correspondence and donations announced.

HON. THOMAS H. WALKER of Pottsville, Penn., read an interesting paper on "The Philosophy and Theory of Punishment." To this subject he had given much time, wide research and serious reflection. He began by alluding to the lax system of prison discipline which prevailed in Europe a century ago, when the jails were nothing but moral pest-houses, where drunkenness and prostitution were the pastime of the inmates; where the innocent and guilty were huddled together in common quarters. At this time Howard, the great apostle of prison reform, came upon the scene of action in England. He visited most of the prisons in Europe and presented such a startling array of facts in reference to prison life, that he was summoned before Parliament and examined with great particularity in regard to his investigations.

The result was the appointment of a Parliamentary commission and the establishment of the true theory of prison discipline, the reformation of the criminal and the protection of society. Human nature was the same inside the prison as outside, actuated by the same motives and resentments. The criminal should, therefore, when practicable, be sentenced to solitary confinement at labor:—solitary confinement in order that he may have opportunity to repent of the enormity of his crimes and his responsibility to the State, and that any good impressions which may be created shall not be dispelled by the scoffs and frivolity of the hardened criminals; and labor, as well as solitude, that he may be taught the value of industry, and learn to appreciate the blessing of the



sentence pronounced upon man "In the sweat of thy brow shalt thou eat thy bread." Brief terms of improvement as a rule were advocated, especially in the case of the young, and at this point the very groundwork of the whole system was reached. The intellectual and moral education of the young was the most effective method of reform. Crime was hereditary like any other disease; our penitentiaries and jails are crowded with the ignorant and depraved, and it would be good economy for the state to gather up the homeless and fatherless children in our large cities, and endeavor to make good men and women of them. There has been a great advance in providing for the physical comfort and treatment of the inmates of our prisons. The sick are cared for in well-lighted and cheery infirmaries. The insane criminals are no longer confined in dungeons and fettered with chains, but are sent to asylums for appropriate treatment. But we need go a step farther; crime is a mental disease and needs a careful diagnosis for its successful eradication, and our system of prison discipline has much to learn in this respect.

The lecturer closed with an eloquent tribute to the memory of Howard, to whom the world owes so much for the alleviation of prison discipline.

At the adjournment on Tuesday, March 16, Mrs. Jerome Carter and Miss L. F. Tyler, both of Salem, were elected members.

Votes of thanks were passed to Rev. Robert Collyer, of New York, for his interesting paper "An Episode in the life of Edward Fairfax," and to Hon. Thomas H. Walker, of Pottsville, Penn., for his valuable paper on "Prison Discipline."

*A List of the Birds of the Hudson Highlands, with  
Annotations.*

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BY EDGAR A. MEARNs.

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[Continued from page 204, Vol. XI.]

**72. *Ægiothus linaria* (Linné).** RED-POLL LINNET; LESSER RED-POLL. An occasional winter visitant; sometimes very abundant.

In 1874, the Lesser Red-polls appeared in flocks about the first of December, and were very abundant until April. For some time after their first appearance, very few adults were seen, nearly all being young birds; but soon old males with rosy breasts and ruby crowns began to come in immense flights, till the swamps of birch-trees which they inhabited, and upon whose seeds they fed, were absolutely swarming with them. So great were their numbers that the supply of birch seeds soon gave out, and then they scattered over the entire region, feeding largely upon seeds of the alder, and of various weeds. During the month of March, the Red-polls far exceeded in numbers the aggregate of any single species that I have ever seen. They were very tame, feeding close to the roadsides and in yards about houses; and, go where one would, they were always found in abundance. They were in full song during the last month of their stay, and the males were in particularly handsome plumage. Their notes resemble those of the American Goldfinch (*Chrysomitris tristis*); but their flight is swifter, and less undulating. They are easily domesticated, and make nice pets.

Mr. William C. Osborn shot a female, on November 9, 1878, near Garrisons; it was feeding in company with the Tit-lark (*Anthus ludovicianus*), in a weedy field near the Indian Brook.

I saw a single Red-poll in a birch-tree in the Central Park, N. Y., on December 20, 1878. During the last week in December and the first day of January (1878-79), they were quite numerous all through the Highlands. Nearly all of the specimens shot were young males, though one or two adult males and females were secured. Dr. Fisher, on the other hand, found only females, at the same time, at Sing Sing, N. Y. On February 8, 1879, Dr. Clinton L. Bagg found a number of Red-polls in some weedy fields on Ward's Island, N. Y.

*Dimensions.*—Average measurements of fifty-seven specimens:—length, 5·32; stretch, 8·68; wing, 2·80; tail, 2·32; culmen, ·36; tarsus, ·56; middle toe, ·36; its claw, ·23.

**73. *Chrysomitris pinus* (Wilson).** PINE GOLDFINCH; PINE LINNET. An occasional winter visitant; sometimes a winter resident, and abundant.

In 1874 the Pine Linnets were found in the hemlocks, feeding upon the cones, as early as October 16. They were frequently met with throughout the winter in large flocks in the alder swamps, accompanying flocks of Red-poll Linnets. Since then I have only seen them on two occasions: in Lewis County, N. Y., January 1, 1878; and on February 6 (same year), when they were numerous at Fort Montgomery (four miles south of Highland Falls), associating and feeding with large flocks of Yellowbirds (*Chrysomitris tristis*) upon the cones of the hemlock.

A specimen was taken by Mr. Frederic S. Osborn at Garrisons, October 17, 1874; and Mr. William C. Osborn took specimens there on November 16, 1878. Mr. Theodore Roosevelt took it August 27, 1874, in Franklin County, N. Y.<sup>1</sup>

Dr. C. Hart Merriam's notice of the "Breeding of the Pine Linnet in Northern New York," published in the "Forest and Stream and Rod and Gun" (Vol. X, No. 24, p. 463, July 18, 1878), is so interesting that I cannot forbear transcribing it entire: "Few birds are more erratic in their habits than the siskin or pine linnet. Occurring to-day, perhaps, in such numbers that one soon tires of shooting them, they are gone on the morrow, and years may elapse before one is seen again. There is, in their melancholy *che-a*, uttered at intervals as small flocks pass in short, waving swoops, far overhead, something sadly suggestive of the cold bleak winds that sweep their northern homes. Yet they are warmly clad, and seem rather to enjoy the wintry blasts that compel most birds to seek a milder clime; and their roaming movements are apparently governed more by some idiosyncrasy in their roving dispositions, and abundance or scarcity of food, than by the severity of the season in the region from which they came.

During the past winter and spring they literally swarmed in Lewis County, N. Y., and thousands of them bred throughout the heavy evergreen forests east of Black River, while many scattered pairs nested in suitable hemlock and balsam swamps in the middle district. They breed remarkably early, and construct large, compact nests, which are usually placed high up on some hemlock or spruce, and well concealed from view. I know of no nest, of equal size, so hard to find. After days of patient search in the evergreen swamps of this vicinity (Locust Grove), Mr. Bagg and myself discovered but a

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<sup>1</sup>The Summer Birds of the Adirondacks in Franklin County, N. Y. By Theodore Roosevelt, Jr., and H. D. Minot.



single nest. On the 13th of April we were hunting in a low swamp, near White River, when a solitary pine linnet attracted our attention by hopping about on some fallen logs. In a few moments she flew into a large hemlock, which stood apart from the rest, and immediately disappeared. After carefully looking over the entire tree, a limb at a time, Mr. Bagg noticed a bunch of something almost completely concealed by a cluster of small branches. We were not sure that it was a nest at all till a well-aimed stick drove off the parent bird, which was shot and proved to be the female. With great difficulty the nest was secured, and it contained, at that early date (April 13), two nearly fledged young. It was tightly saddled on a large limb, about thirty feet from the ground and nearly fifteen feet from the trunk of the tree, and was so nicely hidden that, from a limb directly above, I could not see it at all. One of the young was skinned, while the other now constitutes a contented member of my sister's "happy family," which previously consisted of an oriole (*Icterus baltimore*), three thistlebirds (*Chrysomitris tristis*) and a nonpareil (*Cyanospiza ciris*). He attained his full growth shortly after his capture, and has since thrived on a mixed diet, though, like his cousins the goldfinches, showing a decided preference for the thickly-seeded spikes of the common plantain (*Plantago major*). Also, like his brighter-plumaged companions, he constantly raises and lowers the occipital feathers when at all alarmed.

In plumage he differs from the adult bird, in having the belly marked with yellow, the wing-bars ochraceous instead of whitish, and the upper parts decidedly tinged with rufus. This rufus cast is due to the fact that the bark-centred feathers of the back are, in the young, margined with fulvous-brown, which is not the case with the old bird. The nest is a very bulky structure for so small a bird, and its rough exterior, loosely built of hemlock twigs, with a few sprigs of pigeon moss (*Polytrichum*) interspersed, is irregular in outline, and measures about six inches in diameter. The interior, on the contrary, is compactly woven into a sort of felt, the chief ingredients of which are thistledown and the fur and hair of various mammals. The cavity is lined with horsehair, and measures two inches and a quarter in diameter by an inch and a quarter in depth. This nest is much more flat than that described by Dr. Brewer<sup>2</sup> from Cambridge, Mass., for it measures but two inches in height at its highest point. A considerable mass of dung adheres to the small twigs at one point in its exterior, showing that the bird always "headed" the same way, and was not particularly cleanly in her habits. From the size of the

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<sup>2</sup> Baird, Brewer and Ridgway, Vol. I, p. 482, 1874.



young it is clear that this nest could not have been completed much later than the middle of March.

Not content to let the season pass without making a greater effort to secure their eggs, I accepted on the 15th of April, an invitation from my brother, C. Collins Merriam, to accompany him on an excursion through the densely timbered region about Otter Creek (near the eastern border of Lewis County) and Big Otter Lake (Herkimer County), from which it takes its origin. This entire district lies within the area commonly known as "Brown's Tract," and is Canadian in fauna. Never before at any locality have I seen a species of bird represented by such immense numbers of individuals as here attested the abundance of the pine finch. In every part of the forest, from early in the morning till after the sun had disappeared in the west, there was not a moment that their voices were not heard among the pines and spruce trees overhead. And yet, though among them several days, we were not able to discover a single nest. Never have I searched more faithfully for the eggs of any species, and never has my diligence been rewarded with less success. I at first made a systematic survey of a large number of trees, taking a limb at a time, and then climbed so many that I was barely able to get back to camp, but with no better results.

Their nests are placed so high and amidst such thick evergreen foliage that it is almost impossible to find them. As illustrating the number of this species as well as of the red and white-winged cross-bills (*Loxia curvirostra* var. *Americana* and *L. leucoptera*), it may be worth recording that after firing twenty-two small charges of fine dust shot at the cross-bills as they settled into the top of a single dead hemlock, I picked up fifty-one birds, of which twenty-eight were red cross-bills, eight white-winged, and fifteen pine linnets. I aimed at cross-bills only, killing the linnets by chance. Mr. A. J. Dayan was so fortunate as to secure two sets of their eggs from among the pines near Lyon's Falls (in the Black River Valley). The first was completed March 11, and contained but three eggs on the 18th. The second contained two fresh eggs April 20, and was left till the 25th, but no more were deposited."

*Dimensions.* — Average measurements of eleven specimens: length, 5.00; stretch, 8.63; wing, 2.76; tail, 1.90; culmen, .43; gape, .47; tarsus, .52; middle toe, .45; its claw, .23.

**74. *Astragalinus tristis* (Linné).** AMERICAN GOLDFINCH; YELLOWBIRD. A permanent resident; breeds; common.

This pretty species, in winter, associates in flocks, feeding upon the seeds of birch, alder and hemlock, besides those of numerous weeds. They are not generally recognized in their plain, but neat winter dress, as the gayly-attired Yellowbirds of summer. In winter,

large numbers are sold in the New York markets, in bunches, under the name of "reed-birds."

*Dimensions.*—Average measurements of twenty-nine specimens: length, 5.10; stretch, 8.83; wing, 2.82; tail, 1.95; culmen, .40; gape, .43; tarsus, .54; middle toe, .42; its claw, .21.

**75. *Plectrophanes nivalis* (Linné).** SNOW BUNTING; WHITE SNOWBIRD. An irregular winter visitant. It sometimes arrives early in November, and remains until March. Mr. Thomas W. Wilson procured specimens on the railroad, at Constitution Island, as early as November 8, 1875. Mr. William Church Osborn saw them near Garisons, on November 9, 1878. I have seen flocks on the railroad as late as March 12 (1875).

Large numbers of these white-clad visitors from Arctic climes occasionally appear upon the ice of the frozen Hudson: always in severely cold weather, and very often during snow-storms. During the latter part of the winter of 1874-5, when skating up the river, I found large flocks frequenting the sleigh crossings on the Hudson; and smaller bands were numerous along the railroad upon the left bank. I encountered the first flock near Fishkill Landing, where they were feeding, on the sleigh track crossing the river. A number of them were brought down by the discharge of both barrels of my piece, and most of those left alighted upon the nearest trees on shore, but a few returned to their wounded companions, standing erect beside them, and uttering their loud call-note, as if entreating them to come away. They allowed me to come very near before they would forsake their unfortunate companions, and only left them when life was extinct, unless sooner driven away. When these had rejoined the flock upon the bank, the entire body proceeded northward. Subsequently, the species was common all along the Hudson. I did not molest them again, but took good care of the wounded ones, and afterward brought them safe home. They seemed starved, and ate greedily. Their wounds healed very quickly, and, in a few days, they were able to fly about. Soon they became very tame, and would come upon a table to be fed. They were released in the dining-room, where they spent most of the time among some house plants, at the windows; but, from their visits to the table during meals, they became a source of annoyance, and were shut up at those times. Towards spring they became restless, and struggled to get out of their cages, and, on being released, flew to the windows, pecked the glass, and uttered mournful cries.

Upon the railroad, a few flocks are commonly found spending the winter. These soon become begrimed, almost beyond recognition, by contact with the grease and dirt of the track; but they become very fat, for they are abundantly supplied with food,—the grain that

drops through chinks in the cars. Contrary to their usual habits, they are quite arboreal, spending most of the time upon trees, above the track, only descending occasionally to fill their crops, between the passage of trains. Among the mountains on the right bank of the river, I have rarely seen them. When shooting there on December 30, 1878, a flock of five flew overhead, uttering their wild notes, which seem to me to have a very wintry significance, which is quite in keeping with their white plumage and boreal habitat. They are said to occur occasionally at West Point.

The Snow Bunting breeds in the Arctic regions of Europe, Asia and America. A nest, with its complement of four eggs, taken at Akreyri, Iceland, June 13, 1874, was sent to me, together with a number of odd eggs, by Herr Alfred Benzon, of Copenhagen, and I take advantage of this opportunity to describe them. The nest is quite bulky; composed largely of dry grasses, with considerable long, fine, whitish hair interwoven and lining the inside; also a few feathers of some water-fowl, and some of those of its own species. It was built upon the ground, and still has some earth adhering to it. Its external diameter is about 6·00 inches, internal, nearly 3·00; depth, 2·40 externally, and 1·25 internally. The eggs belonging to this set, four in number, were all accidentally broken, but I have mended one of them perfectly, and the rest will answer for the purpose of description. They closely resemble each other in coloration; their ground-color is distinctly greenish-white, quite evenly marked with blotches of pale purplish-brown, and less numerous dashes of umber-brown; the spotting is a little more distinct at their larger ends. The mended egg measured ·88 by ·65 of an inch.

Seven eggs, taken at Akreyri, Iceland, in 1872, are now before me. Their ground-color varies from pale greenish to dirty white; some are so thickly covered with rusty-brown markings as almost to conceal the ground; others are sparsely or thickly spotted with dark umber-brown or sepia, sometimes aggregated at the larger end, sometimes arranged circularly about that extremity, and sometimes pretty uniformly distributed over the whole egg. They measure, respectively, ·94 × ·67; ·94 × ·68; ·90 × ·64; ·91 × ·63; ·85 × ·65; ·85 × ·66; ·88 × ·62.

*Dimensions.*—Average measurements of ten specimens: length, 6·88; stretch, 12·47; wing, 4·07; tail, 2·70; culmen, ·45; tarsus, ·83.

**76. *Passerculus savanna* (Wilson).** SAVANNA SPARROW. Common during spring and autumn; a few are seen during summer, but none in winter. It will probably prove to be a continuous resident; but of rare occurrence during the breeding season, and in winter. During migrations they are especially numerous upon the marshes. They make a whirring noise in flight, are not shy, and their note is a low *tweet*.



*Dimensions.*—Average measurements of nine specimens: length, 5·68; stretch, 9·10; wing, 2·62; tail, 2·09; culmen, ·43; gape, ·47; tarsus, ·80.

**77. *Poœetes gramineus* (Gmelin).** BAY-WINGED SPARROW. A summer resident; breeds. Arrives in March (30, 1878), and stays till November. It is found in old, weedy fields, and has a pretty little song in the spring.

*Dimensions.*—Average measurements of eleven specimens: length, 6·12; stretch, 10·35; wing, 3·06; tail, 2·38.

**78. *Coturniculus passerinus* (Wilson).** YELLOW-WINGED SPARROW. A summer resident; breeds. Abundant in most parts of the Hudson Valley. In this vicinity there are few localities which suit its habits, and it is, consequently, rare. Mr. Wm. Church Osborn first apprised me of its occurrence, near Garrisons, in some high, sandy fields, where it breeds every summer. A female shot there, May 18, 1878, contained a full-sized ovum.

*Dimensions.*—Average measurements of three specimens: length, 5·38; stretch, 8·52; wing, 2·38; tail, 1·79; culmen, ·47; gape, ·51; tarsus, ·87; middle toe, ·57; its claw, ·15.

**79. *Ammodramus caudacutus* (Gmelin).** SHARP-TAILED FINCH. I have only found it during the month of October (16, 1874; 12, 1877), and at a single locality—on the salt marsh that joins Consook Island to the west shore. Mr. Wm. Church Osborn shot a fine male specimen, in the same place, on October 12, 1878.

*Dimensions.*—Average measurements of two specimens: length, 5·50; stretch, 7·50; wing, 2·24; tail, 2·00; culmen, ·46; gape, ·54; tarsus, ·87; middle toe and claw, ·80.

**80. *Melospiza palustris* (Wilson).** SWAMP SPARROW. A summer resident; breeds. Arrives from the south in March, and stays till December. Occasionally seen in early winter. It will probably be found to be an occasional winter resident in the Highlands, as it is lower down the Hudson. It is found in swampy places inland, about the shores of ponds, and, most abundantly, on the salt marshes along the river. It builds its nest in a tussock of grass, and lays its eggs about the last of May (23, 1877). Its song is pretty, and differs from those of our other Sparrows. Mr. Francis Butterfass showed me an albinistic specimen that was about one-half white, which he shot at Cold Spring, on the Hudson.

*Dimensions.*—Average measurements of fourteen specimens: length, 5·89; stretch, 7·90; wing, 2·34; tail, 2·32; culmen, ·46; gape, ·49; tarsus, ·86; middle toe, ·61; middle toe and its claw, ·85.

**81. *Melospiza fasciata* (Wilson).** SONG SPARROW. An abundant resident species; breeds. Always present throughout even the severest winters, in favorable situations; its abundance and disper-



sion depending on the character of the winter. But these hardy northerners depart in February, and are succeeded by the hosts of its species which make up the great northward migration, which begins late in February. It commences to build in April, and its first clutch of eggs is commonly deposited late in that month. The nest may be found in various situations—frequently attached to rushes in the marshes. On April 27, 1878, a pair of Song Sparrows were incubating their eggs, in an old nest of the Red-winged Blackbird (*Agelaius phoeniceus*). In the same season, young were seen flying by May 18. It is not uncommon to find it sitting upon a late brood of eggs during the month of August. Prof. James M. DeGarmo has a nearly perfect albino, taken at Rhinebeck, on the Hudson.

*Dimensions.*—Average measurements of twenty-five specimens: length, 6·30; stretch, 8·57; wing, 2·52; tail, 2·62; culmen, ·49; tarsus, ·82; middle toe, ·67; middle toe and its claw, ·85.

**82. Junco hyemalis (Linné).** EASTERN SNOWBIRD. An abundant winter resident. Arrives in autumn about the end of September (30, 1874; October 12, 1875; September 23, 1876; October 18, 1879), and remains till May (1, 1873; 9, 1874; 8, 1875; 5, 1876; April 22, 1878; May 8, 1879; April 23, 1880). It breeds plentifully in the Catskill Mountains, and doubtless on the Shawangunk range in Orange County, N. Y. Mr. Wm. Church Osborn found it at Lake Mohonk, Ulster County, N. Y., in July, 1877. The Snowbird sings very sweetly before leaving us in the spring.

*Dimensions.*—Average measurements of twenty-four specimens: length, 6·27; stretch, 9·78; wing, 3·03; tail, 2·71; culmen, ·41; tarsus, ·81; middle toe and its claw, ·72.

**83. Spizella montana (Forster).** TREE SPARROW. A very abundant winter resident. Arrives from the North about the end of October (31, 1874; 30, 1876; November 7, 1877; October 26, 1878; November 17 [or earlier], 1879), and departs in April (29, 1874; 29, 1875; 29, 1876; 13, 1877; March 28, 1878; April 28, 1879; April 8, 1880). In the spring it has a very agreeable song, ending in a loud trill. Its food, in winter, consists largely of the seeds of alder and birch.

*Dimensions.*—Average measurements of twenty-eight specimens: length, 6·36; stretch, 9·46; wing, 2·99; tail, 2·82; culmen, ·41; gape, ·47; tarsus, ·80; middle toe, ·56; middle toe and its claw, ·76.

**84. Spizella socialis (Wilson).** CHIPPING SPARROW. A very abundant summer resident; breeds. Arrives from the South early in April (12, 1874 [2, F. S. Osborn]; 7, 1875; 17, 1876 [15, de Nottbeck]; 16, 1877; 3, 1878; 10, 1879; 5, 1880), and departs late in autumn (October 25, 1874; 29, 1876; 23, 1877; November 29, 1879). Begins to lay about the middle of May (16, 1872; 17, 1873; 12, 1877. Each nest contained its full complement of eggs).

The Chipping Sparrow, like the Marsh Wren (*Telmatodytes palustris*) and some other species, has the habit of waking up in the night and singing. This has also been noted by John Burroughs, C. Hart Merriam, and other writers. Another occurrence, to which attention has also been repeatedly called, is a singular accident to which this species appears to be especially liable, viz.: the frequency with which it meets a tragic end, in consequence of having accidentally become inextricably entangled in the long hairs with which it lines its nest. Three instances of the occurrence of this accident have come under my own observation. The last was shown me by Miss Anna B. Warner, of Constitution Island, in which case the bird was completely netted in the horsehair, which was wound about its wings in the most intricate manner. In the other cases the birds were found suspended from their nests by a single hair, which encircled their necks. In one case the male bird attracted my attention by its repeated cries of distress; and I found the female suspended in the manner indicated, in which condition it had evidently remained for a day or two, as it was very putrid.

*Dimensions*.—Average measurements of eleven specimens: length, 5·37; stretch, 8·73; wing, 2·74; tail, 2·29; culmen, ·36; tarsus, ·64.

**85. *Spizella pusilla* (Wilson).** FIELD SPARROW. An abundant summer resident, arriving in April (28, 1874; 21, 1875; 17, 1876; 26, 1879); begins to lay its eggs about the middle of May (16, 1876; 18, 1878). It has a very pleasant song.

*Dimensions*.—Average measurements of six specimens: length, 5·68; stretch, 8·14; wing, 2·50; tail, 2·55; culmen, ·40; gape, ·42; tarsus, ·74; middle toe, ·50; middle toe and its claw, ·65.

**86. *Zonotrichia albicollis* (Gmelin).** WHITE-THROATED SPARROW. A very abundant spring and fall migrant, arriving, in spring, towards the last of April, and remaining till late in May (5, 1873; April 22 to May 16, 1874; April 30 to May 23, 1875; April 22 to May 28, 1876; April 2 to May 22, 1877; April 27 to May 18, 1878; April 23 to about May 30, 1879; April 14 to May 25, 1880). It reaches us, in autumn, towards the end of September (30, 1874; 23, 1876; 23, 1878), and stays till about the middle of November. Dr. A. K. Fisher saw it at Sing Sing, on the Hudson, on December 1, 1878. It is a regular winter resident in the Central Park, New York City. Mr. Eugene P. Bicknell says,<sup>3</sup> in an article read before the Linnæan Society of New York, and treating of some birds of Riverdale, on the Hudson: "A flock of white-throated sparrows (*Zonotrichia albicollis*), have been about the place all winter, coming to roost in the evening among some large spruce trees close to the house. A few others have

<sup>3</sup> "The Country," Vol. I, No. 23, p. 324, March 30, 1878.

wintered here, but I have failed to find them except in the vicinity of private residences where an abundance of evergreens afford them a suitable shelter."

*Dimensions.*—Average measurements of eighteen specimens: length, 6·74; stretch, 9·46; wing, 2·89; tail, 2·86; culmen, ·50; gape, ·54; tarsus, ·90; middle toe, ·66; middle toe and its claw, ·88.

**87. *Zonotrichia leucophrys* (Forster).** WHITE-CROWNED SPARROW. A rather rare spring and fall migrant. Observed from May 18 (1877) to 23 (1876). Mr. Thomas W. Wilson has taken specimens, at Cold Spring, on the Hudson, on October 12 and 16, 1875, and May 12, 1876.

*Dimensions.*—Average measurements of two adult females (Nos. 1,177 and 1,181, Highland Falls, N. Y., May 23, 1876, E. A. M.): length, 6·88; stretch, 9·82; wing, 3·03; tail, 2·88; culmen, ·50; tarsus, ·85; middle toe and its claw ·81.

**88. *Passer domesticus* (Linné).** EUROPEAN HOUSE SPARROW. *Introduced.* Resident; breeds. It is a pest, here, as everywhere. All intelligent landholders shoot it whenever it appears on their premises. The grape-growers are especially vindictive against it. My gardener complains that it destroys his green peas.

During winter, the English Sparrows frequent the marshes along the Hudson, in large flocks; but, in general, they make their homes in the towns, whence they sally forth to depredate in the country around; but to return to the protection of their city homes at the slightest alarm.

Mr. William Church Osborn furnishes the following interesting observation on its habits: "An adult male Yellow-bellied Woodpecker (*Sphyrapicus varius*) was taken dead, in a back yard on 36th-street, New York City. It was overcome, after a stout resistance, by the united attack of a number (twenty-two were counted that engaged in the affair) of English Sparrows, one of their number having been left dead upon the field along with the luckless Woodpecker."

*Dimensions.*—Average measurements of fifteen specimens: length, 6·33; stretch, 9·72; wing, 3·01; tail, 2·30; culmen, ·50; gape, ·60; tarsus, ·76; middle toe, ·63; its claw, ·21.

**89. *Passerella iliaca* (Merrem).** FOX SPARROW. An abundant spring and fall migrant. In spring, arrives early in March, and stays till about the middle of April (March, 25, 1871; 21, 1873; 5 to April 30, 1874; 16 to April 28, 1875; 6 to April 14, 1876; 23 to April 2, 1877; February 28 to April 4, 1878; March 12 to April 10, 1879; March 6 to April 8, 1880). In autumn, arrives towards the end of October, and stays till about the first of December (October 22 to November 25, 1874; October 28, 1876; November 9 to December 8, 1877; October 26, 1878; October 26 to November 30, 1879).

This handsome species is the largest of our Sparrows, and the first



strictly migratory species to appear in spring. It begins to sing soon after its arrival. Its notes are full and rich; and, when singing, it is apt to be perched on a tree-top, although it frequently sings in a brush-heap. Its ordinary note is a low *tweet*, sometimes modulated so as to resemble the Cedar-bird's note; and it also gives a sharp, metallic utterance like the Brown Thrasher's (*Harporhynchus rufus*). Its flight is accompanied by a loud whirring sound.

*Dimensions*.—Average measurements of twenty-three specimens: length, 7·26; stretch, 11·14; wing, 3·39; tail, 2·85; culmen, ·50; gape, ·57; tarsus, ·96; middle toe, ·64; its claw, ·31.

**90. *Zamelodia ludoviciana* (Linné).** ROSE-BREADED GROSB-EAK. A summer resident; breeds. Most abundant during its migrations. Arrives early in May (13, 1873; 9, 1874; 13, 1875; 11, 1876; 16, 1877; 9, 1878; 10, 1879; 4, 1880), and stays through September (21, 1874).

This lovely bird is found in the open woods; but it also resorts to fields and orchards in the springtime. Its black-and-white colors remind one strongly of the Bobolink; but, besides, its folded wing conceals the rose-colored lining in the male, and yellow in his plainer-clad mate; and,—most conspicuous,—a patch of brightest carmine adorns the breast of the male. The Rose-breasted Grosbeak destroys the fruit-blossoms in the orchards, being especially fond of those of the cherry; and I suppose that it really does some damage to the crops; this, to my mind, however, it more than compensates for, by adding so much brightness and melody to the happiest of seasons. But it has another bad habit: where fields, newly sown with the cereal grains, are convenient to its woodland retreats—for it is a shy bird—its species will collect in large flocks, and resort there continually, as long as there is a grain of seed to be had.

*Dimensions*.—Average measurements of sixteen specimens:—length, 8·12; stretch, 12·92; wing, 4·02; tail, 2·99; culmen, ·69; gape, ·76; tarsus, ·88; middle toe, ·64; its claw, ·27; middle toe and its claw, ·83.

**91. *Passerina cyanea* (Linné).** INDIGO BIRD. A common summer resident; breeds abundantly. Arrives early in May (10, 1872; 13, 1873; 12, 1874; 12, 1875; 20, 1876; 14, 1877; 4, 1878; 15, 1879; 7, 1880), and departs in September (20, 1876; 19, 1879).

These pretty birds are common in neglected fields, and in the edge of the woods. I have known them to dwell, and rear their young, in the densest swamps of the wilderness, but this is quite exceptional, and they are rarely seen away from civilized parts. Their nests are built in bushes—commonly in blackberries growing along fences, or even in gardens of cultivated raspberries. Their song is very clear and fine. They pillage the grain-fields in company with the Purple Finch and Rose-breasted Grosbeaks. In autumn, associated in im-



mense flocks, they are seen feeding with the Blackbirds and Reedbirds upon the salt marshes along the Hudson, when it is interesting to observe the various transitional phases of their plumage, so well exhibited by an abundance of differing individuals.

*Dimensions*.—Average measurements of sixteen specimens: length, 5.59; stretch, 8.52; wing, 2.58; tail, 2.11; culmen, .41; gape, .45; tarsus, .67; middle toe, .49; its claw, .19.

**92. *Cardinalis virginianus* (Brisson).** CARDINAL GROSBEEK; VIRGINIA REDBIRD. A bird flew close past me down a ravine in the woods, on May 11, 1876. It uttered a note which I distinctly remember; it must have been a Cardinal Grosbeak, though I was not then certain about its identity, thinking it might be the Summer Tanager (*Pyrranga aestiva*).

**93. *Pipilo erythrophthalmus* (Linné).** GROUND ROBIN; MARSH ROBIN; TOWHEE BUNTING; CHEWINK. An abundant summer resident; breeds. Arrives the last of April (27, 1872; May 8, 1873; May 7, 1874; April 30, 1875; April 25, 1876; May 5, 1877; April 26, 1878; April 27, 1879; April 28, 1880), and stays till late in autumn (October 15, 1874; 11, 1875, Wilson, at Cold Spring; 25, 1876 [one that had been disabled was captured on the 28th]).

*Dimensions*.—Average measurements of seventeen specimens:—length, 8.35; stretch, 11.14; wing, 3.34; tail, 3.68; culmen, .55; gape, .71; tarsus, 1.09; middle toe, .73; its claw, .30; middle toe and its claw, 1.00.

#### Family, **ICTERIDÆ.**

**94. *Dolichonyx oryzivorus* (Linné).** BOBOLINK; REED-BIRD; RICE-BIRD. A summer resident; breeds. Arrives early in May (12, 1873; 21, 1875; 23, 1876; 22, 1877; 5, 1878), and stays till about the end of September (10, 1874; 22, 1876; 18, 1879). Not a very abundant summer resident; but occurs in large flocks during August and September, feeding upon the salt marshes along the Hudson.

*Dimensions*.—Average measurements of eight males:—length, 7.55; stretch, 11.95; wing, 3.76; tail, 2.73; culmen, .60; tarsus, 1.10; middle toe and its claw, 1.06. Female:—length, 7.15; stretch, 11.25; wing, 3.54; tail, 2.53; culmen, .58; gape, .61; tarsus, 1.07.

**95. *Molothrus ater* (Gmelin).** COW-BIRD; COW-BLACKBIRD. A common summer resident; breeds abundantly. Arrives about the first of April (29, 1873; 18, 1874 [Frederic S. Osborn, at Garrisons]; 29, 1875; 17, 1876; 13, 1877; March 30, 1878; April 5, 1879; April 10, 1880), and disappears in August.

On Long Island, and in the vicinity of New York, Cow-birds spend the winter; but they have not been seen in the Highlands at that season. Mr. Jas. S. Buchanan took a perfect albino, at Newburgh,

on the Hudson. Cow-Blackbirds come to us in abundance early in April, and may then be seen running swiftly and gracefully about,—not hopping,—and picking up seeds in newly-planted fields. They are reproductive parasites, as well as polygamists. One of their eggs was hatched by the European House Sparrows, in Highland Falls, N. Y.; the young Cow-bird thrived, and remained with the Sparrows in the town for some time, and it was a common sight to see them feeding it in the street. Their amours are conducted in an amusing manner. The sexes associate indiscriminately, and in varying proportions. The males, in green-black and chocolate-brown dress, commence the performance by walking about with their necks arched, and decurved, so that their bills nearly touch the ground; then a male approaches one of the females,—which are considerably smaller, and brownish in color,—running at full speed, and, when close to her, pitches forward till his bill nearly touches the ground: this as if in salutation. The different males repeat this movement, and the more ardent ones ruff up all their feathers, and drag their expanded tails upon the ground, as they strut up to the side of their favorites, with skins inflated to an indefinite and alarming extent by the amorous passions within; meanwhile they utter various uncouth guttural noises, some of which resemble the loud, “cork-drawing” notes of the *Corvidæ*, while others are precisely like the sounds produced by tilting a partly empty cask. The females pay little attention, fill their crops, and utter an occasional note resembling that of the Cedar-bird (*Ampelis cedrorum*).

*Dimensions.*—Average measurements of eleven males: length, 7·92; stretch, 13·57; wing, 4·24; tail, 3·01; culmen, ·67; gape, ·68; tarsus, 1·02; middle toe, ·72; middle toe and its claw, ·94; claw alone, ·25. Average measurements of five females: length, 7·18; stretch, 12·22; wing, 3·84; tail, 2·68; culmen, ·61; gape, ·63; tarsus, ·94; middle toe, ·64; middle toe and its claw, ·94; claw alone, ·26.

**96. *Agelæus phœniceus* (Linné).** RED-WINGED BLACKBIRD; MARSH BLACKBIRD. A common summer resident; breeds. Arrives about the beginning of March (first seen March 25, 1871; April 2, 1872; March 31, 1873; April 25, 1874; March 18, 1875; 6, 1876, Thomas W. Wilson; April 7, 1877; March 27, 1878; 29, 1879; 28, 1880), and departs before December (last seen November 17, 1877).

*Dimensions.*—Average measurements of twenty-two males: length, 9·51; stretch, 15·23; wing, 4·72; tail, 3·77; culmen, ·93; gape, ·97; tarsus, 1·11; middle toe, ·77; middle toe and its claw, 1·05. Average measurements of eight females: length, 7·74; stretch, 12·56; wing, 3·92; tail, 3·01; culmen, ·74; tarsus, 1·01.

**97. *Sturnella magna* (Linné).** MEADOW-LARK; FIELD-LARK. A resident species; but only occasional, and never abundant, in win-

ter; breeds in favorable situations. The migrants arrive, or pass through, in March (April 10, 1873; 2, 1877; March 30, 1878; April 5, 1879; April 6, 1880).

*Dimensions.*—Average measurements of four males: length, 10·75; stretch, 16·53; wing, 4·76; tail, 3·16; culmen, 1·35; gape, 1·45; tarsus, 1·72; middle toe, 1·15; middle toe and its claw, 1·53; claw alone, ·35. Female: length, 9·57; stretch, 14·86; wing, 4·22; tail, 2·75; culmen, 1·30; gape, 1·35; tarsus, 1·60; middle toe, 1·17; its claw, ·40.

**98. *Icterus spurius* (Linné).** ORCHARD ORIOLE. A common summer resident; breeds. Arrives early in May (9, 1872; 19, 1873; 13, 1874; 9, 1875; 7, 1876 [5, de Nottbeck, at Fishkill]; 15, 1877; 12, 1878; 8, 1879; 3, 1880), and remains till late in September (17, 1874).

*Dimensions.*—Average measurements of eleven males: length, 7·32; stretch, 10·34; wing, 3·18; tail, 2·92; culmen, ·65; gape, 74; tarsus, ·88; middle toe, ·58; its claw, ·26.

**99. *Icterus galbula* (Linné, 1758).** BALTIMORE ORIOLE. An abundant summer resident; breeds plentifully. Arrives early in May (9, 1872; 11, 1873; 9, 1874; 9, 1875; 7, 1876; 13, 1877; 3, 1878; 6, 1879; 2, 1880), and departs early in September (22, 1874.) In a nest of unusually large size, found in a pear-tree near my house by Louis A. Zerega, in June, 1874, there were no less than eight eggs.

*Dimensions.*—Average measurements of twenty-three specimens: length, 7·53; stretch, 11·72; wing, 3·52; tail, 2·84; culmen, ·70; tarsus, ·85.

**100. *Scolecophagus ferrugineus* (Gmelin).** RUSTY GRACKLE. A common spring and fall migrant. Arrives from the South early in March (30, 1873; 19, 1874; 17, 1875; 14, 1876; April 5, 1879; March 11, 1880), and all pass through before the end of May. Returning in autumn, they are found from September until December.

*Dimensions.*—Average measurements of ten specimens: length, 9·55; stretch, 14·60; wing, 4·61; tail, 3·52; culmen, ·91; tarsus, 1·06; middle toe and its claw, ·75.

**101. *Quiscalus purpureus* (Linné).** PURPLE GRACKLE; CROW BLACKBIRD. A spring and fall migrant. I do not know that any breed in the Highlands; but numbers do so about Newburgh, and Fishkill-on-the-Hudson, just above the Highlands; and the species nests plentifully lower down the river. It arrives in March (11, 1871; 6, 1874; February 29, 1877, Fishkill, de Nottbeck; March 8, 1878; 12, 1879). In autumn, it remains till November.

In the mountains, Crow Blackbirds are quite uncommon, although they are abundant on both sides of us. In Orange County, I have observed them in the greatest numbers. On the first of May last, I took the stage at Newburgh, for Cornwall. The bridge at Moodna Creek was being repaired, so the coach proceeded *via* Vail's Gate.



On the way, were seen large numbers of Grackles, of varieties *purpureus et aeneus*. The stage was a horribly rickety, old rattletrap, which still bore some slight vestiges of the conventional yellow color with which it had originally been decorated; on its top were piled some long, crooked, heavy iron rods, which rattled dangerously overhead. This splendid vehicle was drawn by two lean and ghostly horses, whose best days were passed a decade or more ago; as the driver whipped them up the long hills, I could not help feeling that I was doing violence to my humanity by sitting on the driver's seat instead of getting out and helping the horses pull, as my conscience told me I ought to be doing. The roads and fences were lined with sturdy, old cedars, and, in these, the grackles were ensconced. As we drove past, almost brushing the branches, they hopped down close to us, leered at our bony nags, peered into the coach and screamed derisively at us, and spread their tails in high glee as they called to their neighbors in advance to join in the merriment at our expense, and they in turn jeered us as we passed by. I could not help feeling ashamed, and, involuntarily, turned to see if our red-nosed driver shared my emotions. The Crow Blackbirds were scattered over the fields on both sides of the road. The bronzed variety shone like gold in the sunlight, while the purple ones glittered brilliantly in their metallic plumage.

I have never known them to breed in the mountains; but in all the low-lying meadow-country along the Hudson, they do so abundantly—especially where coniferous trees abound.

*Dimensions.*—Average measurements of adult male: length, 12·50; stretch, 17·75; wing, 5·55; tail, 5·40; culmen, 1·17; gape, 1·35; tarsus, 1·45; middle toe, 1·00; its claw, ·34.



REGULAR MEETING, MONDAY, APRIL 5, 1880.

MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Rev. George H. Hosmer, of Salem, and Rev. E. C. Butler, of Beverly, were duly elected members.

*Voted*, That the thanks of the Institute be tendered to Hon. George B. Loring for courtesies and civilities extended to members of the Institute and their friends, during the recent visit to Washington, D. C.

Prof. EDWARD S. MORSE made a communication on the persistence of Korean art in Japanese pottery. His remarks were illustrated by numerous examples of Korean and Japanese ware. One very conspicuous character of Korean pottery of three hundred years ago was the inlaying of the ornamentation in white or black upon a gray ground. The design being first cut out in delicate lines or large areas in the case of leaves, or else impressed by means of a stamp. These depressed portions were then filled in with either white or black pigments. He showed that wherever the Korean potters had settled in Japan as in Satsuma, Higo, Hizen, Suwo, and other places, the pottery still bears the impress of this peculiar method of ornamentation.



REGULAR MEETING, MONDAY, APRIL 19, 1880.

MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Hon. NATHAN CROSBY, of Lowell, read an interesting and valuable paper entitled "Essex County and Essex County Men."

The paper is printed in the Historical Collections of the Essex Institute, Vol. XVII, April, 1880.



REGULAR MEETING, MONDAY, MAY 3, 1880.

MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

William D. Dennis, of Salem, was elected a resident member.

R. A. Brock, of Richmond, Va., was duly elected a corresponding member.

Messrs. James Kimball, T. F. Hunt, and H. W. Putnam, were appointed a committee to nominate a list of officers to be balloted for at the Annual Meeting.

A vote of thanks was passed to Hon. Nathan Crosby, for his paper on "Essex County and Essex County Men," read by him at a recent meeting of the Institute.

The Secretary was instructed to ask Judge Crosby for a copy of the paper for publication.

Mr. HUNT stated that the "Roundabout Club," of Melrose, proposed to visit Salem on the 17th of June next, and on the motion of the same gentleman, the President and Secretary were made a committee to extend the civilities of the Institute to the club.

*Voted*, To hold the "Winthrop" Field Meeting on the 22d of June next.

## ANNUAL MEETING, MONDAY, MAY 17, 1880.

THE ANNUAL MEETING, this evening at 7.30 o'clock.  
The PRESIDENT in the chair. Records of last Annual Meeting read.

The reports of Secretary, Treasurer, Auditor, Librarian, and the Curators and Committees were read and duly accepted, and ordered to be placed on file.

Rev. George W. Gardner, of Marblehead, was elected a member.

The Committee appointed at the previous meeting to nominate a list of officers for the ensuing year reported the following :

## PRESIDENT:

HENRY WHEATLAND.

## VICE-PRESIDENTS:

ABNER C. GOODELL, JR.,  
FREDERICK W. PUTNAM,

WILLIAM SUTTON,  
DANIEL B. HAGAR.

## SECRETARY:

GEORGE M. WHIPPLE.

## TREASURER:

GEORGE D. PHIPPEN.

## AUDITOR:

RICHARD C. MANNING.

## LIBRARIAN:

WILLIAM P. UPHAM.

## CURATORS:

*History*—JAMES KIMBALL.*Manuscripts*—WILLIAM P. UPHAM.*Archæology*—FREDERICK W. PUTNAM.*Numismatics*—MATTHEW A. STICKNEY.*Geology*—ISAAC J. OSBUN.*Botany*—GEORGE D. PHIPPEN.*Zoology*—EDWARD S. MORSE.*Horticulture*—HENRY W. PUTNAM.*Music*—JOSHUA PHIPPEN, JR.*Painting & Sculpture*—T. F. HUNT.*Technology*—EDWIN C. BOLLES.

## COMMITTEES:

*Finance:*The PRESIDENT, *Chairman ex off.*

JAS. KIMBALL.    JAS. O. SAFFORD.    HENRY M. BROOKS.    GEO. R. EMMERTON.  
 The TREASURER, *ex off.*

*Library:*

CHARLES W. PALFRAY.    GEORGE F. FLINT.    HENRY F. KING.  
 WILLIAM NEILSON.    WILLIAM D. NORTHEED.  
 The LIBRARIAN, *ex off.*

*Publication:*

EDWARD S. ATWOOD.    ABNER C. GOODELL, JR.    EDWIN C. BOLLES.  
 JAMES KIMBALL.    T. F. HUNT.  
 JAMES A. EMMERTON.

*Lecture:*

FREDERICK W. PUTNAM.    AMOS H. JOHNSON.    ARTHUR L. HUNTINGTON.  
 FIELDER ISRAEL.    ROBERT S. RANTOUL.

*Field Meeting:*The SECRETARY, *Chairman ex off.*

GEORGE A. PERKINS, Salem.    GEORGE D. PHIPPEN, Salem.  
 GEORGE COGSWELL, Bradford.    JAMES H. EMERTON, Salem.  
 FRANCIS H. APPLETON, Peabody.    EBEN N. WALTON, Salem.  
 NATHANIEL A. HORTON, Salem.    WINFIELD S. NEVINS, Salem.  
 EDWARD S. MORSE, Salem.

The PRESIDENT appointed Messrs. Caleb Cooke and William Neilson to receive and count the ballots. These gentlemen attended to their duty, and reported that nineteen ballots were thrown all for the persons above stated, and the ticket as nominated was declared elected.

VICE PRESIDENT F. W. PUTNAM referred to the coming Winthrop Field Meeting and read a humorous paper, written by Mr. Horace Scudder and read by him at a late club dinner. It was entitled "A Memorial Supper on the death of the Memorable and truly Honorable John Winthrop, Esq."



## THE RETROSPECT OF THE YEAR

compiled from the several reports read at the meeting, presents the work of the Institute in the various departments since the last annual meeting.

**MEMBERS.**—Changes occur in the list of our associates by the addition of new names, and the withdrawal of some by resignation, removal from the county or vicinity, or by death. Eleven resident members have died, and we have received information of the decease of three of our correspondents.

*Alfred Peabody*, son of Nathan and Hannah (Stickney) Peabody, born Feb. 3, 1806; merchant; died at Salem, June 13, 1879, aged 73 yrs., 4 mos., 10 days. Elected a member March 26, 1851.

*Edward Fitzgerald*, physician in Salem; born in Ireland Jan. 1, 1826; son of Richard and Johannah (Fitzgerald) Fitzgerald; died July 7, 1879. Elected a member March 30, 1859.

*Thomas M. Saunders*. In early life a captain and supercargo in the East India trade; a merchant; son of Daniel and Sarah (Gill) Saunders, born June 10, 1795; died Aug. 19, 1879. Elected a member July 6, 1864.

*Joseph A. Goldthwaite*, son of Ezekiel and Mary (Fuller) Goldthwaite; born at Salem, Aug. 25, 1813; a cooper, in early life; at the time of his decease, superintendent of the Old Men's Home, Salem; died Sept. 2, 1879, aged 66 years. Elected a member May 8, 1857.

*Henry L. Williams*; merchant and an ex-mayor of Salem; son of Israel and Lydia (Waite) Williams, born at Salem, July 23, 1817; died Sept. 27, 1879. Elected a member Sept. 16, 1867.

*Benjamin F. Mudge*, son of James and Ruth (Atwell)

Mudge, of Lynn; born in Orrington, Me., Aug. 11, 1817; graduated at Wesleyan Univ., 1840; a lawyer, and mayor of Lynn in 1852; removed to Kansas in 1861—State Geologist and Professor of Natural History in State Agric. College; died at Manhattan, Kans., Nov. 21, 1879. Elected a member April 23, 1856.

*Nathaniel Brown*, son of Nathaniel and Elizabeth (Millett) Brown, of Salem; sea captain and merchant, mayor of Salem; born March 19, 1827; died Dec. 10, 1879, aged 52 yrs., 8 mos., 22 days. Elected a member July 6, 1864.

*Charles Lawrence*, son of Abel and Abigail (Page) Lawrence, born at Salem, Oct. 7, 1795, graduated at Harv. Univ. 1815; in early life went several voyages to India, in later life retired on a farm in Danvers; died in Danvers, Dec. 21, 1879, aged 84. Original member.

*Josiah Newhall*, son of Jacob and Ede (Marble) Newhall, of Lynnfield, born in Lynnfield, June 6, 1794. In early life a teacher, afterwards a farmer and horticulturist; died in Lynnfield, Dec. 26, 1879. Elected a member Feb. 13, 1867.

*Thomas Mayo Brewer*, son of Thomas Brewer, born Nov. 21, 1814, in Boston, graduated at Harv. Univ., 1835; a physician, afterwards an editor and publisher, distinguished as an ornithologist; died in Boston, Jan. 23, 1880, aged 65 years. Elected a corresponding member Oct. 26, 1859.

*Richard Frothingham*, son of Richard and Mary (Thompson) Frothingham, born in Charlestown, Mass., Jan. 31, 1812, and was devoted during all his life to literary pursuits; author of "History of Charlestown," "History of the Siege of Boston," "Life of Gen. Joseph Warren," etc., many years co-editor of the Boston Post, ex-mayor of Charlestown; died at Charlestown, Jan. 30, 1880.

*Benjamin Hodges Silsbee*, son of William and Mary (Hodges) Silsbee; born at Salem, October 10, 1811; graduated at Harv. Univ., 1831; merchant; died Feb. 22, 1880. An original member.

*Lewis N. Tappan*, son of Eben and Sallie (Hooper) Tappan, born in Manchester, engaged in Mining operations, winters spent in Boston, summers in Manchester; died in Leadville, Colorado, Feb. 25, 1880. Elected a member Oct. 5, 1874.

*William Dean Waters*, son of Joseph and Mary (Dean) Waters, born at Salem, Nov. 30, 1798; merchant; died at Salem, April 20, 1880.

FIELD MEETINGS.—Four during the summer. *First*, near Ship Rock, South Peabody, on Friday, June 20, 1879, the afternoon session was held in the chapel near by. Rev. George F. Wright, of Andover, spoke of the geology of that vicinity, Messrs. James H. Emerton and G. A. Perkins, of Salem, on the plants collected, Rev. C. C. Carpenter and Samuel Brown, of South Peabody, Rev. Messrs. Israel and Hosmer, of Salem, and the chairman, on historical and general subjects. *Second*, at Andover, Friday, June 27, 1879. The various places of historical or scientific interest were visited during the forenoon, under the direction of Rev. George F. Wright, of that place. The afternoon session was held in the Free Congregational Church. The speakers were Rev. George F. Wright, Prof. William H. Niles, Rev. Francis H. Johnson, Prof. Goldsmith, principal of the Punchard High School, Mr. J. H. Emerton, Rev. Selah Merrill, and Rev. E. S. Atwood. *Third*, at the Asylum Station in Danvers, Thursday, July 31, 1879. The afternoon session was held in Hathorne Hall, in the Asylum Building. Dr. May, the superintendent, gave a description of the building, method of heating, ventilation, etc. The President and

Mr. Andrew Nichols alluded to the historical associations of this locality. Rev. L. M. Livermore, Mr. J. H. Emerton, Dr. George A. Perkins, Rev. Fielder Israel, Rev. Mr. Wright, of Danvers, made appropriate remarks. *Fourth*, at Bay View, Gloucester, the seaside residence of Col. J. H. French, by whose invitation a very pleasant meeting was held, Wednesday, Aug. 27, 1879. The Cape Ann Literary and Scientific Society united with the Institute on this occasion. Col. French, Dr. Conant, President of the Cape Ann L. and S. Society, Judge Davis, Mr. J. H. Emerton, Judge Drake, of the Court of Claims, Washington, D. C.; Prof. A. Hyatt, Dr. Davis, and Mr. N. A. Horton were among the speakers.

EXCURSIONS.—Three excursions. *First*, a summer excursion, embracing the following interesting points: Saratoga Springs, Watkins Glen, Seneca Lake, Niagara Falls, River St. Lawrence and Thousand Isles, Montreal and Lake Memphremagog, left Salem, Tuesday, July 15, 1879, and returned on Thursday, July 24. *Second*, the autumnal excursion during the first week in September, leaving Salem, Tuesday, Sept. 2, 1879, for Saratoga, Lake George, Ticonderoga, Lake Champlain, Montpelier, Vt., and the Franconia mountains, returning on Saturday, Sept. 6. *Third*, to Washington, D. C., and Richmond, Va., leaving Salem on Thursday, March 18, 1880, and returning Saturday, March 27, with a side trip to Mount Vernon and sufficient time to notice many objects of interest in the two cities.

LECTURES.—A course of eight Geographical lectures under the direction of the Lecture Committee, was as follows: *1st*, Monday, Sept. 29, 1879, Rev. E. S. Atwood,



"Palestine." 2d, Monday, Oct. 13, 1879, Rev. George T. Flanders, "Spain, Morocco and Algiers." 3d, Monday, Oct. 27, 1879, Frederick E. Ober, "Lesser Antilles." 4th, Monday, Nov. 10, 1879, S. G. W. Benjamin, "Portugal." 5th, Monday, Dec. 1, 1879, Rev. E. C. Bolles, "England." 6th, Monday, Dec. 22, 1879, E. S. Morse, "Japan." 7th, Monday, Jan. 5, 1880, Thomas Davidson, "Athens." 8th, Monday, Jan. 12, 1880, Rev. A. P. Peabody, "Russia." These lectures were carefully prepared and most of them were illustrated by lantern views, and were instructive.

In addition to the above, three courses of lectures, and one of readings of six each—free to the public—were given; the only condition was that persons desiring to attend should apply for tickets at the rooms of the Institute. The results have been most gratifying. The class of people for whom these lectures were intended has been reached, and the hall has been filled with quiet, appreciative, and attentive audiences.

1st, six lectures by L. E. BECKWITH, "*The Lives and Writings of the Prose Authors of the Age of Queen Anne*," on Thursday afternoons, beginning Nov. 6, 1879; 2nd, six lectures by CHARLES SEDGWICK MINOT, upon "*Comparative Embryology*," on Tuesday afternoons, commencing Jan. 6, 1880; 3d, six lectures by EPHRAIM EMERTON, "*The Beginnings of Modern Life*," on Wednesday afternoons, commencing March 3, 1880; Prof. HENRY KLEIN, "*French and German Readings*," on Monday afternoons, commencing Monday, Feb. 16, 1880.

In addition to the above we may include the three lectures on "*Old England*," by Rev. E. C. BOLLES, on Wednesdays, March 24, 31, and April 7, 1880, and a lecture by Rev. C. T. BROOKS, on the "*Roman Cam-*

*pagna*," on Monday, March 8, 1880. These were not under the direction of the Institute.

MEETINGS.—*Regular Meetings* usually on the first and third Monday evenings of each month. The following communications received and lectures delivered may be specified: Mr. *James Samuelson*, of Liverpool, on "Darwinism" and on "The Classification of Animals;" *William H. Tappan*, of Manchester, "Gold and Silver Mines and Miners," the results of his experience in California, Nevada, and Colorado; *James H. Emerton*, "Animals living at the bottom of Salem Harbor," the results of dredging during the summer of 1879; *W. S. Nevins*, "Mount Vesuvius and the ruins of Pompeii;" *D. B. Hagar*, "Spelling Reform;" *F. W. Putnam*, "The former Indians of Southern California, bearing on the origin of the Red Man in America;" *E. S. Morse*, "The influence of Early Korean Art upon Japanese Pottery;" Rev. *Edward Collyer*, of New York, "An Episode in the life of Edward Fairfax;" *Thomas H. Walker*, of Pottsville, Pa., "On Prison Discipline;" *Nathan Crosby*, of Lowell, "Essex County and Essex County Men;" Rev. *Robert C. Mills*, "Memoir of James Upton;" *James Kimball*, "On the Early manufacture of Glass in Salem," "Notes on the Richardson and Russell Families;" *Henry F. Waters*, "The Gedney and Clarke Families, of Salem, Mass.;" *William P. Upham*, "Records of the First Church at Salisbury, Mass., 1687-1754."

CONCERTS.—Under the personal direction of the curator of music five concerts have been given, with much credit to the society as musical performances. The eleventh season.

1st, Monday, Nov. 3, 1879, Mrs. G. C. Adams, Miss

Ita Welsh, Mr. W. E. G. Evans and Dr. E. C. Bullard, under the direction of Mr. J. Phippen, jr., curator of music. *2nd*, Monday, Dec. 8, 1879, Mr. W. H. Sherwood, pianist, M<sup>me</sup> Luisa Cappiani, soprano, Miss Julia A. Wells, contralto, and Dr. Albion M. Dudley, tenor. *3d*, Monday, Feb. 2, 1880, by Miss Fannie Lovering, soprano, Mr. Bernhard Listemann, violin, Mr. Alex. Heindl, violoncello, Mr. J. Phippen, jr., piano-forte. *4th*, Monday, Feb. 23, 1880, Piano-forte Recital by Mr. John A. Preston, assisted by Miss Sara W. Barton, soprano. *5th*, an operetta, "The Crimson Scarf," Friday, April 9, 1880.

Mr. Joshua Phippen, jr., the Curator, gave in October three piano-forte recitals; these were quite successful and drew together cultivated audiences.

**LIBRARY.**—The additions to the Library for the year May, 1879—May, 1880, have been as follows:—

*By Donation.*

Folios.....	27
Quartos.....	94
Octavos.....	483
Duodecimos.....	415
Sexdecimos.....	301
Octodecimos.....	52
Total of bound volumes.....	1,372
Pamphlets and Serials.....	6,494
Total of Donations.....	7,866

*By Exchange.*

Quartos.....	10
Octavos.....	102
Duodecimos.....	10
Sexdecimos.....	2
Octodecimos.....	2
Total of bound volumes.....	126
Pamphlets and Serials.....	1,881
Total of Exchanges.....	2,007

*By Purchase.*

Quartos.....	1
Octavos.....	66
Duodecimos.....	50
Sexdecimos.....	23
Total of bound volumes.....	140
Pamphlets.....	82
Total of Purchases.....	172
Total of Donations.....	7,866
Total of Exchanges.....	2,007
Total by Purchase.....	172
Total of Additions.....	10,045

Of the total number of pamphlets and serials, 4,090 were pamphlets, and 4,317 were serials.

The donations to the Library for the year have been received from one hundred and eighty-six individuals and twenty-seven societies and departments of the General and State Governments. The exchanges from seven individuals, one hundred and forty-four societies and incorporate institutions, of which ninety-one are foreign; also from editors and publishers.

Donations or exchanges have been received from the following:—

	Vols.	Pam.
Abbot, Francis E., Boston, Mass., . . . . .	3	
Adams, H. B., Baltimore, Md., . . . . .		6
Adelaide, Philosophical Society, . . . . .		1
Albany, N. Y. State Library, . . . . .	4	8
Alnwick, Berwickshire Naturalists' Field Club, . . . . .		1
American Association Advancement of Science, . . . . .	1	
American Social Science Association, . . . . .		1
Anagnos, M., Boston, Mass., . . . . .		1
Andrews, Mrs. James H., . . . . .		1
Andrews, Wm. P., . . . . .		44
Anthony, J. G., Estate of the late, . . . . .	29	217
Appleton, Wm. Sumner, . . . . .	1	
Archer, Geo. B., Brooklyn, N. Y., . . . . .		1
Augsburg, Naturhistorischer Verein, . . . . .		1
Baetz, Henry, Milwaukee, Wis., . . . . .		1
Baltimore, Maryland Historical Society, . . . . .		2



	Vols.	Pam
Baltimore, Md., Peabody Institute, . . . . .		1
Bancroft, Cecil F. P., Andover, Mass., . . . . .		2
Barton, Wm. G., . . . . .		5
Batavia, Bataviaasch Genootschap van Kunsten en Wetenschappen, . . . . .	1	13
Batavia, Natuurkundige Vereeniging in Nederlandsch India . . . . .		1
Beedham, B., . . . . .	1	
Belfast, Naturalists' Field Club, . . . . .		1
Bemis, Luke, West Chester, Penn., . . . . . Newspapers,		
Bergen, Bergenske Museum, . . . . .	1	
Berlin, Gesellschaft Naturforschender Freunde, . . . . .		1
Berlin, Verein zur Beförderung des Gartenbaues, . . . . .		24
Bolles, Rev. E. C., . . . . . Newspapers,	11	123
Bologna, Accademia delle Scienze, . . . . .		1
Bonn, Naturhistorischer Verein der preussischen Rheinlande, und Westphalens, . . . . .	4	2
Bordeaux, Académie des Sciences, Belles-Lettres et Arts,	5	
Bordeaux, Société Linnéenne, . . . . .		6
Boston, American Academy of Arts and Sciences, . . . . .	1	1
Boston, City of, . . . . .	3	
Boston, Mass. Historical Society, . . . . .	2	
Boston, Mass. Horticultural Society, . . . . .		2
Boston, Mass. Institute of Technology . . . . .		1
Boston, Mass. Medical Society . . . . .		1
Boston, N. E. Historic and Genealogical Society, . . . . .	1	5
Boston, Public Library, . . . . .		16
Boston, Scientific Society, . . . . .		6
Boston, Society of Natural History, . . . . .	1	15
Boston, Society of Medical Improvement, . . . . .	1	
Boynton, Herbert W., Boston, Mass., . . . . .	7	16
Bradlee, Rev. C. D., . . . . .		1
Braunschweig, Archiv für Anthropologie . . . . .	1	3
Bremen, Naturwissenschaftlicher Verein, . . . . .		1
Briggs, Miss M. E., . . . . . Charts, Maps,	92	20
Bristol, Naturalists' Society, . . . . .		2
Brock, R. A., Richmond, Va., . . . . . Newspapers,	5	9
Brooks, Henry M., . . . . .	6	4
Brooks, W. K., Baltimore, Md., . . . . .		1
Brown, Horace, . . . . .	23	37
Brunn, Naturforschender Verein, . . . . .		3
Bruxelles, L'Académie Royale des Sciences des Lettres, des Beaux Arts de Belgique, . . . . .	6	

	Vols.	Pam.
Bruxelles, Société Belge de Microscopie, . . . . .	1	12
Bruxelles, Société Entomologique de Belgique, . . . . .		12
Bruxelles, Société Malacologique de Belgique, . . . . .	1	33
Buenos Aires, Sociedad Científica Argentina, . . . . .		1
Buffalo, Historical Society, . . . . .	1	
Buffalo, Young Men's Association, . . . . .		2
Burnham, John H., Bloomington, Ill., . . . . .	1	
Butler, George, . . . . .		1
Caen, L'Académie Nationale des Sciences, Arts et Belles- Lettres, . . . . .	1	1
Calcutta, Geological Survey of India, . . . . .	7	11
Caldwell, Augustine, Ipswich, Mass., . . . . .		5
Cambridge, Library of Harvard University, . . . . .		1
Cambridge, Museum of Comparative Zoölogy, . . . . .		10
Cambridge, Nuttall Ornithological Club, . . . . .		4
Cambridge, Peabody Museum of American Archæology and Ethnology, . . . . .	1	
Canterbury, N. Z. Philosophical Institute, . . . . .		3
Case, L. P., Richmond, Ind., . . . . .		12
Cassel, Verein für Naturkunde, . . . . .		1
Chandler, Gardner L., . . . . .		49
Chaney, Geo. L., Boston, Mass., . . . . .		1
Chase, Benj., Auburn, N. H., . . . . .	1	
Cherbourg, Société Nationale des Sciences Naturelles, . . . . .	1	1
Chicago, Historical Society, . . . . .	11	69
Christiania, Kongelige Norske Universitet, . . . . .	2	3
Christiania, Videnskabs Selskabet, . . . . .	3	1
Cole, Miss Caroline J., . . . . .		2
Cole, Mrs. N. D., . . . . .	3	151
Collett, John, Indianapolis, Ind., . . . . .	1	
Columbia, Mo., State University Library . . . . .	1	2
Conklin, Wm. A., New York, N. Y., . . . . .		2
Cooke, Caleb, . . . . .	1	
Cresson, Ezra T., Philadelphia, Penn., . . . . .	1	
Crosby, Mrs. M. K., . . . . .	415	752
Cutter, Abram E., Charlestown, Mass., . . . . .		9
Danzig, Naturforschende Gesellschaft, . . . . .	1	
Darmstadt, Verein für Erdkunde, . . . . .	1	
De Borre, Alf. Preudhomme, Bruxelles, . . . . .		3
Dodge, Robert, New York, N. Y., . . . . .		1
Doolittle, Miss E., Troy, N. Y., . . . . .		1
Dresden, Naturwissenschaftliche Gesellschaft, "Isis," . . . . .		2
Dresden, Verein für Erdkunde, . . . . .		1

	Vols.	Pam.
Dublin, Royal Irish Academy, . . . . .		10
Dudley, Charles B., Altoona, Penn., . . . . .		1
Dunning, Rev. Chas. U., Lawrence, Mass., . . . . .		7
Dürkheim, Die Pollichia, . . . . .		3
Edes, H. H., Charlestown, Mass., . . . . .	1	
Emden, Naturforschende Gesellschaft, . . . . .		2
Emerton, James H., . . . . . Newspapers,		
Emilio, Luis F., San Francisco, Cal., . . . . .		1
Emmerton, James A., . . . . .		38
Erlangen, Physikalisch-medicinische Societät, . . . . .		1
Essex Agricultural Society, . . . . .		1
Falmouth, Eng., Royal Cornwall Polytechnic Society, . . . . .		1
Fearing, Andrew C., jr., Boston, Mass., . . . . .	1	5
Fewkes, J. Walter, Cambridge, Mass., . . . . .		1
Flanders, Rev. G. T., Lowell, Mass., . . . . . Newspapers,		3
Fogg, Miss Ellen M., . . . . .	1	
Folsom, Chas. F., Boston, Mass., . . . . .	1	
Foote and Horton, . . . . . Newspapers,		
Foster, W. E., Providence, R. I., . . . . .		1
Fowler, H. Gilbert, and others, Auburn, N. Y., . . . . .		2
Frankfurt, Senckenbergische naturforschende Gesellschaft,		5
Frankfurt, Zoologische Gesellschaft, . . . . .		18
Freiburg, Naturforschende Gesellschaft, . . . . .		1
Genève, Institut National Genevois, . . . . .	2	
Genève, Société de Physique et d'Histoire Naturelle, . . . . .		1
Giessen, Oberhessische Gesellschaft für Natur und Heil- künde, . . . . .		1
Gillis, James A., . . . . .	32	33
Goode, G. Brown, Middletown, Conn., . . . . .		1
Goodell, A. C., jr., . . . . .	1	1
Görlitz, Naturforschende Gesellschaft, . . . . .		1
Göttingen, Königliche Gesellschaft der Wissenschaften, . . . . .	2	
Gould, John H., Topsfield, Mass., . . . . .	3	
Gould, Miss M. E., . . . . .	21	
Gray, Arthur F., Danversport, Mass., . . . . .		1
Green, Samuel A., Boston, Mass., . . . . .	10	482
Gulliver, Rev. John P., Andover, Mass., . . . . .		1
Halifax, Nova Scotian Institute of Natural Science, . . . . .		1
Hall, E. W., Waterville, Me., . . . . .		1
Halle, Kaiserliche Leopoldinisch-Carolinische Deutsche Akademie der Naturforscher, . . . . .		7
Hamburg, Naturwissenschaftlicher Verein, . . . . .		3
Hamburg, Verein für Naturwissenschaftliche Unterhaltung,		1

	Vols.	Pam.
Hannover, Naturhistorische Gesellschaft, . . . . .		1
Harlem, Société Hollandaise des Sciences, . . . . .	1	
Hart, Chas. Henry, Philadelphia, Penn., . . . . .		2
Hawkins, Dexter A., New York, N. Y., . . . . .		1
Hedge, F. H., jr., Lawrence, Mass., . . . . .		20
Henry, Thomas Elder, Dalkey, Ireland, . . . . .		1
Hobart Town, Royal Society of Tasmania, . . . . .		1
Hoffman, Mrs. Chas., . . . . .	16	
Holmes, J. C., Detroit, Mich., . . . . .	1	
Hoppin, James M., New Haven, Conn., . . . . .		1
Horton, N. A., . . . . .	5	
Hotchkiss, Miss Susan V., New Haven, Conn., . . . . .		23
Huguet-Latour, Maj., Montreal, . . . . .		5
Hunt, T. F., . . . . .	40	75
Ill. State Agricultural Society, . . . . .		1
Israel, Rev. Fielder, . . . . . Newspapers,		50
Ives, H. P., . . . . .		532
Ives, Mrs. Wm., . . . . . Newspapers,	76	36
Jenison, O. A., Lansing, Mich., . . . . .		2
Jenkins, Chas. T., . . . . .	3	
Jocelyn, Miss M. E. W., . . . . .		9
Johnson, Mrs. Samuel, . . . . .	1	2
Kempf, Matthew, . . . . .		1
Ketchum, Rev. Silas, Poquonock, Conn., . . . . .		3
Kidder, Frederic, Boston, Mass., . . . . .		1
Kimball, James, . . . . . Newspapers,	29	47
Kimball, Mark, Chicago, Ill., . . . . .		1
Kjöbenhavn, Botanisk Tidsskrift, . . . . .		6
Kjöbenhavn, Kongelige Danske Videnskabernes Selskab,		3
Knox, John Jay, Washington, D. C., . . . . .		1
Lander, Miss Elizabeth, . . . . .		8
Langdell, Miss Annie, . . . . .		1
Langworthy, I. P., Boston, Mass., . . . . .		138
Larned, Josephus N., Buffalo, N. Y., . . . . .		11
Lawrence, Geo. N., . . . . .		13
Lawrence, Public Library, . . . . .		1
Lee, Francis H., . . . . . Newspapers,	2	152
Leeds, Philosophical and Literary Society, . . . . .		1
Le Mans, Société d'Agriculture, Sciences, et Arts de la Sarthe, . . . . .		1
Leveridge, C. A., Dunellen, N. J., . . . . .		1
Liège, Société Royale des Sciences, . . . . .	2	
Lincoln, Francis H., Boston, Mass., . . . . .		1



	Vols.	Pam.
Lincoln, Solomon, jr., . . . . .	37	86
London, Royal Society, . . . . .		13
Lord, Mrs. Geo. R., . . . . .		593
Lowell, Old Residents' Historical Association, . . . . .		1
Lund, Kongliga Universitetet, . . . . .	2	12
Lüneburg, Naturwissenschaftlicher Verein, . . . . .		1
Luxembourg, Institut Royal Grand Ducal, . . . . .		1
Lyon, Société d'Agriculture, Histoire Naturelle et Arts Utiles, . . . . .		1
Lyon, Société Linnéenne, . . . . .		1
Mack, Mrs. David, Belmont, Mass., . . . . .	20	182
Mack, Miss Esther C., . . . . .	1	
Mack, William, . . . . .		4
Madison, Wis. Historical Society, . . . . .	1	
Madrid, Observatorio, . . . . .	7	
Madrid, Sociedad Española de Historia Natural, . . . . .		1
Manning, R. C., . . . . .		1
Manning, Robert, . . . . . Newspapers,		14
Manson, A. S., Boston, Mass., . . . . .		2
Marburg, Gesellschaft zur Beförderung der Gesamnten Naturwissenschaften, . . . . .		9
Marsh, O. C., New Haven, Conn., . . . . .		1
Marshall, John W., Rockport, Mass., . . . . .		1
Martindale, Isaac C., . . . . .		1
May, Calvin S., Danvers, Mass., . . . . .		1
Mecklenburg, Verein der Freunde der Naturgeschichte,		1
Meek, Henry M., . . . . .	1	
Mexico, Museo Nacional, . . . . .		3
Milburn, Jos., Buffalo, N. Y., . . . . .	3	
Mills, Abraham, New York, N. Y., . . . . .		1
Mills, Rev. R. C., . . . . .	7	183
Milwaukee, Wis., Naturhistorischen Verein, . . . . .		3
Montpelier, Vt., Historical Society, . . . . .	1	
Montpelier, Vt., State Library, . . . . .	11	1
Montreal, Canada, Geological Survey, . . . . .	2	3
Morse, E. S., . . . . .	4	46
München Königlich Bayerischen Akademie der Wissen- schaften, . . . . .		19
Münster, Westfälische Provinzial Verein für Wissenschaft und Kunst, . . . . .		1
Nagle, John T., New York, N. Y., . . . . .		2
Nashville, Board of Health, . . . . .	1	
Neuchatel, Société des Sciences Naturelles, . . . . .	1	1

	Vols.	Pam.
Nevins, W. S., . . . . .	8	8
Newark, N. J., Historical Society, . . . . .		1
Newhall, Miss Eliza G., . . . . .		1
New Haven, Conn., Academy of Arts and Sciences, . . . . .	1	
New Haven, Yale College Library, . . . . .		1
New York, Academy of Sciences, . . . . .		4
New York, American Chemical Society, . . . . .		1
New York, American Geographical Society, . . . . .	2	4
New York, American Water Color Society, . . . . .		1
New York, Chamber of Commerce, . . . . .	1	
New York, Genealogical Biographical Society, . . . . .		4
New York, Historical Society, . . . . .		1
New York, Mercantile Library Association, . . . . .		1
Nichols, The Misses, . . . . .	6	
Noble, Edward H., . . . . .	39	21
Norfolk, John R., . . . . .	44	89
Oliver, Henry K., . . . . .	26	62
Orange, N. J., N. E. Society, . . . . .		1
Packard, Mrs. A. S., jr., . . . . .	1	
Paine, H. D., New York, N. Y., . . . . .		3
Palfray, Chas. W., . . . . . Newspapers,		143
Paris, Athenée Oriental, . . . . .		1
Paris, L'Institution Ethnographique, . . . . .		4
Paris, Société Américane de France, . . . . .		1
Paris, Société d'Acclimatation, . . . . .		16
Paris, Société d'Anthropologie, . . . . .		5
Paris, Société des Etudes Historiques, . . . . .		10
Peabody, John P., . . . . .		12
Peabody, Mass., Peabody Institute, . . . . .		1
Peet, Rev. S. D., Clinton, Wis., . . . . .		3
Peirce, Henry B., Secretary of State, Boston, Mass., . . . . .	4	
Pennsylvania, University of Medical Department, . . . . .		1
Perkins, Geo. A., . . . . .		49
Perkins, Henry, Philadelphia, Pa., . . . . .	16	65
Perry, Wm. Stevens, Davenport, Iowa, . . . . .		1
Petterd, Wm. F., . . . . .	1	
Philadelphia, American Philosophical Society, . . . . .		3
Philadelphia, Library Company, . . . . .		2
Philadelphia, Mercantile Library Company, . . . . .		1
Philadelphia, Numismatic and Antiquarian Society, . . . . .		3
Philadelphia, Pennsylvania Historical Society, . . . . .		5
Phillips, Henry, jr., Philadelphia, Pa., . . . . .		6
Phoenix, S. Whitney, New York, N. Y., . . . . .	3	

	Vols.	Pam.
Pickering, Mrs. Chas., Boston, Mass., . . . . .	1	1
Pickering, Miss Mary, . . . . . Newspapers,	9	11
Pierce, B. O., Beverly, Mass., . . . . .	1	3
Pool, Wellington, Wenham, Mass., . . . . .		3
Poore, Ben. Perley, Washington, D. C., . . . . .		1
Pope, Miss Lydia, . . . . .	1	
Porter, Robert P., Chicago, Ill., . . . . .		1
Prince, Geo. H., St. Petersburg, . . . . .		1
Princeton, N. J., E. M. Museum of Geology and Archæology,		1
Procter, Joseph O., Gloucester, Mass., . . . . .		1
Providence, Rhode Island Historical Society, . . . . .		1
Putnam, Rev. A. P., Brooklyn, N. Y., . . . . .		1
Putnam, F. W., . . . . . Newspapers,		34
Quebec, Literary and Historical Society, . . . . .		1
Regensburg, Königliche bayerische botanische Gesellschaft,	1	1
Rhees, Wm. J., Washington, D. C., . . . . .		1
Rice, Wm., Springfield, Mass., . . . . .		1
Robinson, John, . . . . . Newspapers,	2	185
Ropes, N., Cincinnati, O., . . . . .	1	1
Ropes, Miss S., . . . . .	1	
Ropes, Rev. Wm. L., Andover, Mass., . . . . .		1
Sale, Chas. L., Chelsea, Mass., . . . . .	1	
Sale, John, Chelsea, Mass., . . . . .	2	3
Salem, Ladies' Centennial Committee, . . . . .	6	
San Francisco, California Academy of Sciences, . . . . .		1
San Francisco, Mercantile Library Association, . . . . .		1
S'Gravenhage, Nederlandsche Entomologische Vereeni- ging, . . . . .		3
Shepard, Jas. E., Lawrence, Mass., . . . . .	1	51
Shepard, Miss Nellie J., New York, N. Y., . . . . .		5
Silsbee, Mrs. B. H., . . . . .	204	770
Sinclair, Chas. A., Boston, Mass., . . . . .	1	
Soule, Chas. C., Boston, Mass., . . . . .	1	9
Spofford, A. R., Washington, D. C., . . . . .		1
Stearns, Robert E. C., San Francisco, Cal., . . . . .		1
Stearns, Samuel, Lawrence, Mass., . . . . .	1	2
Stearns, W. A., . . . . .	4	
Steiger, E., New York, N. Y., . . . . .		1
St. Gallen, St. Gallische Naturwissenschaftliche Gesell- schaft, . . . . .		1
Stickney, Miss Cornelia, . . . . .		17
Stilson, Rev. Arthur C., Ottumwa, Iowa, . . . . .		1
St. Louis, Mo. Academy of Science, . . . . .		1

	Vols.	Pam.
St. Louis, Mo. Public School Library, . . . . .		2
Stone, Miss Mary H., . . . . . Newspapers,		
St. Paul, Minnesota Historical Society, . . . . .	16	15
St. Pétersburg, Académie Impériale des Sciences, . . . . .		7
St. Petersburg, Imperial Botanical Garden, . . . . .		1
Stroyer, Rev. Jacob, . . . . .		1
Sydney, Royal Society of New South Wales, . . . . .	2	
Tanaka, His Excellency Mr., Tokio, Japan, . . . . .	2	2
Tasmania, Government of, . . . . .	1	
Taunton, Eng., Somersetshire Archæological and Natural History Society, . . . . .	1	
Taunton, Mass., Old Colony Historical Society, . . . . .		1
Taunton, Mass., Public Library, . . . . .		2
Taylor, Wm. B., Washington, D. C., . . . . .	1	
Tenney, Mrs. H. A., Lansing, Mich., . . . . .	1	
Thomson, Peter G., Cincinnati, O., . . . . .		1
Topeka, Kansas Historical Society, . . . . .		2
Townsend, John P., New York, N. Y., . . . . .		3
Trondhjem, Kongelige Norske Videnskabers Selskab, . . . . .		3
Tuttle, Chas. W., Boston, Mass., . . . . .		1
Unknown, . . . . .		7
Upham, Wm. P., . . . . . Newspapers,		46
Upton, Jas., Estate of the late, . . . . .	19	63
Upton, Winslow, Detroit, Mich., . . . . .	1	
U. S. Bureau of Education, . . . . .	2	2
U. S. Dept. of Agriculture, . . . . .		1
U. S. Dept. of Interior, . . . . .	2	2
U. S. Dept. of State, . . . . .	1	
U. S. Engineer Dept., . . . . .	7	
U. S. Naval Observatory, . . . . .	4	10
U. S. Patent Office, . . . . .		53
U. S. P. O. Dept., . . . . .	1	
U. S. Treasury Dept., . . . . .	3	5
Utica, Oneida Historical Society, . . . . .		1
Verrill, A. E., New Haven, Conn., . . . . .		1
Wadsworth, H. A., Lawrence, Mass., . . . . .	1	
Wallis, Al. C., Upsala, . . . . .		3
Walter, Jos. R., Wilmington, Del., . . . . .		1
Walton, E. N., . . . . .		82
Washington, D. C., Smithsonian Institution, . . . . .	1	9
Waters, E. Stanley, . . . . .		11
Waters, J. Linton, . . . . .		64
Waterville, Me., Colby University, . . . . .		2



	Vols.	Pam.
Watson, Miss C. A., . . . . .	1	1
Welch, Wm. L., . . . . .	2	4
Wheatland, Miss E., . . . . . Newspapers,		
Wheatland, H., . . . . . Newspapers,	14	21
Wheatland, Miss Martha G., . . . . .	2	11
Whipple, Geo. M., . . . . . Newspapers,	1	6
Whipple, S. K., Newburyport, Mass., . . . . .		2
White, Rev. Wm. O., Boston, Mass., . . . . .		6
Wien, K. K. Zoologisch botanische Gesellschaft,	1	
Wien, Verein zur Verbreitung Naturwissenschaftlicher Kentnisse, . . . . .	1	
Wilder, Marshall P., Dorchester, Mass., . . . . .	2	5
Wilkins, Mrs. Chas., . . . . .	1	
Wilmington, Delaware Historical Society, . . . . .		2
Willson, Rev. E. B., . . . . .		41
Winthrop, Robert C., Boston, Mass., . . . . .		2
Woods, Mrs. Kate T., . . . . .		146
Worcester, American Antiquarian Society, . . . . .		2
Worcester, Society of Antiquity, . . . . .		1
Wurzburg, Physikalisch-medicinische Gesellschaft, . . . . .	1	2
Zurich, Naturforschende Gesellschaft, . . . . .		4

The following have been received from editors or publishers :—

American Bookseller.	[Arts.	Lynn Reporter.
American Journal of Science and		Musical Herald.
American Naturalist.		Nation.
Bangs' Catalogue.		Nature.
Beverly, N. J. Banner.		Our Dumb Animals.
Boston Herald.		Peabody Press.
Canadian Entomologist.		Peabody Reporter.
Canadian Naturalist.		Quaritch's Catalogue.
Cape Ann Bulletin.		Review, P. H. S.
European Mail.	[Journal.	[Friend.
Familiar Science and Fanciers'		Sailors' Magazine and Seamen's
Francis' Catalogue.		Salem Gazette.
Gardener's Monthly.		Salem Observer.
Ipswich Antiquarian Papers.		Salem Post.
Lawrence American.		Salem Register.
Librarian.		Turner's Public Spirit.
		Vox Humana.

Zoologischer Anzeiger.

**HORTICULTURE.**—The annual Horticultural Exhibition opened on Tuesday, Sept. 9, 1879, and closed on Thursday evening, Sept. 11. The display was good, the flowers, ferns, pot plants and gladioli being very beautiful. There was a good show of vegetables and fruits; of the latter, the pears took the lead in the number of varieties. David Wentzell had some handsome Gravenstein apples and other fruit, also a good display of vegetables; F. H. Appleton a fine collection of the products of "Broadfield's Farm;" the Plummer Farm School some giant Ruta-bagas Mangel-wurtzel, and Stone Mason cabbage, etc.; R. B. Gifford and Samuel W. Pease some mammoth early Crawford peaches; Henry Poor some fine clusters of grapes, Hamburgs and Black Prince; T. Putnam Symonds a good cluster of Hartford Prolifics; Mr. Wilkinson, figs.

The centre of the hall was occupied with potted ferns and plants from the greenhouses of John Robinson and H. W. Putnam; Charles A. Putnam a beautiful pyramid of gladioli, at the head of the hall a handsome collection of asters, coleus, and pinks.

Among the exhibitors were the following:—Charles A. Ropes, seventy-five dishes of fruit, George Pettingell, forty-nine dishes, Aaron Nourse, thirteen, David Wentzell, twenty. Fruit from George Bowker, E. H. Noble, John Osborne, T. P. Symonds, Miss S. Ropes, Wm. H. Dennett, Wm. Mack, George D. Putnam, Ezekiel Goss, Miss E. P. Richardson, William L. Welch, Joseph Symonds, James P. Cook, Mrs. M. Wilkinson, J. W. Barton, George D. Glover, Mrs. Wm. F. Gardner, C. A. Buxton, John W. Grant. Cut flowers from Mrs. C. A. Ropes, H. W. Putnam, Mrs. C. H. Miller, Mrs. W. F. Gardner, Mrs. E. D. Kimball, Mrs. J. P. Cook, Joseph Symonds, Wm. H. Whipple, B. D. Hill. Ferns from John Robinson. Pot plants from John Robinson,

Henry Poor, Dr. H. C. Merriam, Miss Wilkinson, Mrs. J. P. Cook.

ART EXHIBITIONS.—There have been during the past year, two exhibitions by the artists and amateurs of Salem and its immediate vicinity—under the direction of the CURATOR of ART. The first was held on Wednesday, Thursday, and Friday, June 11, 12 and 13, 1879. The collection was confined, with one or two exceptions, to the works of the artists of Salem, and as such was extremely gratifying to all who are interested in æsthetic culture—comprising some fine oil paintings, beautiful sketches in water colors, charcoal, and crayons; tiles and decorated china, some charming results of the Potters' wheel, almost equalling Limoges and Faience; a good exhibit of pottery from the Beverly establishment; some excellent mechanical drawings, original designs for oil cloths, etc., the work of the pupils of our public schools. Some fifty-three artists represented were residents of Salem, contributing over two hundred paintings and specimens of decorative art.

The following is a list of the principal pieces on exhibition:—

St. John the Baptist and other pictures, Miss Mary R. Kimball; head (oil), pencil drawings, Mrs. Horace S. Perkins; oil paintings, C. C. Redmond; Cashmere goat, Sybil (copy), Chilian milk venders, D. M. Shepard; oil paintings, J. Mackintire; rocks at Marblehead, Julia S. Warden; water colors, C. P. Brown; souvenir of Lexington, Henry Chapman; head in charcoal, water colors, storks, pottery, Miss M. M. Brooks; house, seven gables, Geo. M. White; dog's head, tile, G. B. Haskell; old Notch house, Miss Agge; pencil drawing, H. R. Stone; Beverly shore, oil pictures, pastel, Miss Louisa Lander;

wild flowers, Miss C. Grant; water colors, Miss A. Cassino; charcoal sketch, Miss J. F. Barker; violets, apple blossoms, and other pictures, Miss E. B. Gardner; crayon, storks, W. W. and F. L. Morse; drawings, Mrs. H. C. Weston; drawings by M. Killham, A. L. Cone, E. French, B. Whitney, L. Atwood, S. S. Kimball, S. S. Kelley, J. J. Redmond, A. Porter, H. E. Carlton, C. S. Sanborn, M. L. Hill, H. G. Hale, F. L. Morse, F. Moody, H. Effie, C. S. Bliss. Oil panels, Miss E. K. Bolles; panels, Miss A. B. Holden; oil (hare), Mrs. G. P. Osgood; fuchsia, Miss S. S. Kimball; Japanese tea pot, C. K. Bolles; views in Beverly, A. E. Downes; sketches in oil, Miss H. F. Osborne; water colors, Miss L. L. A. Very; collection of pencil and pen drawings by J. H. Emerton; charcoal drawings, G. L. Chandler; six charcoal sketches, Miss S. E. Smith; collection of thirty-nine sketches in oil and charcoal, from nature and objects, by Miss S. E. Smith and pupils; three oil paintings, C. P. Brown; stork, cast from model, Miss M. E. Stanley; oil panel, charcoal and other sketches, Miss H. K. Osgood; six oil paintings, Misses Williams; oil panels, Miss Kinsman; charcoal sketches, Miss Phippen; Sorrento carving, W. W. Northend; pen and ink panel, Miss Northend; wild flowers, Miss E. D. Williams; tea pot and tray, Miss Cassino; decorated mirror frame, Miss A. Perkins; apple blossoms, Miss M. A. Cook; lilacs, pansies, (panels), horse chestnuts (oil), Miss S. E. C. Oliver; heads, oil, quick sketches, Miss H. F. Osborne; five water colors, Miss K. Peirson; four oil pictures, C. C. Redmond; thirteen oil pictures, George Newcomb; collection of seven sketches in water colors, by Chas. F. Whitney and pupils; popular and choice decorations, Misses Lander, Hood, Chadwick, Perkins, Williams, Machado, Willson, Cleveland, Smith, Silsbee, Brooks, Pratt, Osgood, King,



Phillips, Mr. G. B. Haskell, Mr. W. W. Northend; embroidery, Misses Peirson, Chadwick, Forrester, Mrs. E. S. Johnson, Mrs. J. Robinson; tiles painted in oil, pupils of Miss S. E. Smith.

The *Second Exhibition* opened on Thursday, April 29, 1880. The collection embraced some three hundred and fifty contributions, covering a wide range in variety of oil, water-color, crayon, charcoal and sepia sketches, elegant Kensington work, decorated china, plaques and panels, pottery and screens with laces and embroidery.

Among the artists whose works were represented are the following:—clay models and oil paintings, Miss L. L. A. Very; two oil paintings, Miss Ida Caller; oil painting, Miss H. F. Osborne, and one from Miss A. Machado; two paintings, ornamented plate, Miss L. B. Hood; marine view, Clark Oliver of Lynn; seven paintings, G. L. Chandler; two views, Mrs. N. A. Frye; "Low Tide," H. A. Hallett; tile and decorated china, Mrs. N. A. Frye; decorated fans, etc., Miss Charlotte Chase; two pencil studies, Miss Mary L. Webb; table cover, door panel, and fire screen, Miss C. L. Grant; oil painting, Thomas Pitman; two paintings, Helen Philbrick; do. Miss C. S. Philbrick; ornamented tile, Miss M. P. Ober; ornamented tile and china, Abby G. Pingree; two views, J. W. Averill; lace work, Mrs. H. M. Toppan; ornamented fans, Miss E. Phillips, Mrs. J. C. Lee, and Mrs. F. H. Lee; six paintings, Martha O. Barrett of Peabody; painting of flowers, Miss E. E. Barrett; water colors, Miss M. Taylor and M. A. Fornis; four oil paintings, Mrs. C. N. Clark; paintings and embroidery, Miss M. R. Stevens; charcoal drawing and pen and ink sketch, J. W. Thyng and Miss S. C. Harris; panel pictures, Mrs. George H. Jacobs; water colors and char-

coal drawings, Miss H. M. King; pen and ink drawings, Mrs. N. G. Symonds; flowers, Miss E. R. Plaisted; oil painting, Mr. C. C. Redmond; ornamented tile and panels, Miss H. L. Kimball; oil paintings, Miss S. E. Pratt; ornamented china, etc., from Miss E. W. Chadwick and Miss A. B. Holden; decorated plate, Miss A. F. Perkins; three easels, Mrs. Chas. W. Perkins; charcoal drawings, Miss E. A. Nichols; "Derby wharf," C. P. Brown; ornamented tile, Henry A. Chapman; embroidered work, Mrs. G. F. Ropes, Susie O. Currier; inlaid work, C. E. Larrabee; oil sketches, Miss H. K. Osgood; panel pictures, Mrs. G. P. Osgood; table cover, Miss M. W. Farrington; charcoal sketch, Mrs. E. S. Johnson; crayon drawing, Miss A. H. Short; landscapes on fans, Miss A. Sweetser; oil colors and plate, Miss E. T. Dike; embroidered work, Mrs. G. B. Jewett; twelve cards, Miss Lucy H. Cleveland; ornamented vases, C. A. Lawrence; crayon and pen sketches, Arthur M. Frye; panel, Miss E. F. Earle; plate, Miss Lander; lion's head from a cast, Miss A. A. Agge; lambrequin, Miss Ella W. Fisk; crayon work, Miss M. E. Dockham; blankets, Miss A. Pitman; oil painting, plates, cups and saucers, Mrs. E. S. Johnson; india ink drawings, Mrs. H. H. Davis; paintings, by Miss S. E. C. Oliver and eight of her pupils; sketch of E. I. Marine Hall, interior view, by J. H. Emerton; embroidered work, by Mrs. P. T. Pickering and Miss E. R. Pickering; oil colors, Miss E. B. Gardner, and Misses E. B. and Bessie Gardner; apple blossoms, Miss Goldthwaite; water colors, Miss M. M. Brooks; crayon portraits, C. H. Fillebrown; fans, Mrs. R. C. Manning; painting, Miss A. L. Pike; oil colors, J. S. Warden; panels, Mrs. C. W. Smith; fans and lace, Misses M. G. and E. Wheatland; apples, Annie Forrester; fancy work, Miss E. Forrester; paintings, Miss Nellie Phippen; pen and ink drawing,

fancy cards, Geo. M. White; screens and panels, Miss Holden; fans, Miss Susan E. English; water colors and fan, M. E. Stanley and Miss Ada Pitman; flowers, Mrs. Jos. Symonds; oil paintings, Misses M. E. and A. O. Williams; drawing on wood, Miss Rosie Symonds; fan, Mrs. H. S. Perkins; water color studies, Mrs. C. W. Smith; embroidery, Miss Nellie F. Clarke; bracket, S. C. Weston; water colors, G. W. Harvey of Gloucester; sofa pillow, Miss F. L. Pitman; Kensington work, Miss A. Chadwick; worsted work, Miss L. Eaton; tile and stand, Miss E. W. Chadwick; interior of Dr. Bolles' study, Kimball Bolles; two drawings, each of a locomotive, one by George H. Goodell aged nine years and the other by Henry Gardner aged seven years, were very noticeable under such circumstances. A screen by Miss Edith Rantoul; a case of fine specimens of pottery in original designs, made from Salem clay and baked in this city, by Miss Louisa Lander, occupied the centre of the hall. Miss L. has been for some time experimenting in glazes, and has discovered one which appears to be fully equal to that of the celebrated Limoges ware for depth and brilliancy of color. An imitation of Japanese ware was also good.

MUSEUM.—The specimens in Natural History including those in Ethnology and Archæology, which have been given during the year, are on deposit with the trustees of the Peabody Academy of Science, in accordance with previous arrangement. These have been reported at our meetings and have been duly acknowledged to the several donors. In addition to the above those of an historical character or possessing artistic interest have been arranged in the rooms. The following may be specified as contributors: John Robinson, Miss M. E. Briggs, Charles T.

Perkins, Miss Ravel, Miss E. B. Gardner, James Kimball, J. H. Huntington, Robert Brookhouse, Miss F. P. Ashton Snow, Edw. Stanley Waters, W. Kite, Caleb Buffum, E. C. Bolles, David Nichols, A. S. Peabody, Mrs. N. D. Cole, T. B. Nichols, H. K. Oliver.

PUBLICATIONS have been issued as heretofore,—the BULLETIN, vol. xi, and HISTORICAL COLLECTIONS, vol. xvi. The exchange list, with few exceptions, continues the same as last year.

MANUSCRIPTS from Miss Mary E. Briggs, Mrs. James Pope of Melrose, Miss Caroline R. Derby's estate, George E. Emery of Lynn, Mrs. Joseph S. Cabot, James A. Gillis, Caleb Buffum, John A. Norfolk, and T. F. Hunt.

FINANCIAL.—The Treasurer's Report exhibits the receipts and expenditures of the past year, presented in detail, but here condensed for printing.

#### RECEIPTS.

Balance on hand, commencement of year.....	\$254 76
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#### *General Account.*

Salem Athenæum $\frac{1}{2}$ expense, 1878—\$136 90	} =.....	\$264 77
“ 1879 127 87		
Dividend and return tax.....	31 77	
Assessments, 888 00; Publications, 582 67; Donations, 47 50, =	1,518 17	
Lectures, Concerts, Excursions and Hall,.....	2,904 10	
		\$4,718 81

#### *Historical Fund.*

Interest of investment,.....	43 50
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#### *Natural History Fund.*

Interest of investment,.....	28 00
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#### *Davis Fund.*

Interest of investment,.....	482 85
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*Ditmore Fund.*

Interest of investment,.....	180 00
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*Manuscript Fund.*

Interest of investment,.....	40 08
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*Ladies' Fair Fund.*

Interest of investment,.....	60 00
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*Derby Fund.*

Rent of land,.....	30 00
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*Wm. B. Howes Fund.*

Received from executrix,.....	\$24,400 00	
Interest received since investment,.....	895 00	
	<hr/>	24,795 00
		<hr/>
		\$30,633 00

## EXPENDITURES.

*General Account.*

Salem Athenæum, rent 1878—\$350 } "    1879— 350 } =.....	\$700 00
Salaries, \$2,045 00; Publications, \$1,668 93 =.....	3,713 93
Fire Insurance \$60; Books 107 82 =.....	167 82
Sundry Accounts,.....	368 80
	<hr/>
	4,950 55

*Historical Fund.*

Book binding,.....	116 00
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*Natural History Fund.*

Book binding,.....	21 50
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*Davis Fund.*

Interest Warren Savings Bank [Funded].....	102 85
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*Ditmore Fund.*

F. J. Perkins, Annuity,.....	100 00
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*Manuscript Fund.*

Interest Five Cents Savings Bank [Funded].....	40 08
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*Howes Fund.*

Amount invested, per Separate Report,.....	24,496 91
Paid on account of old note.....	300 00
Balance in hands of Treasurer,.....	505 11
	<hr/>
	\$30,633 00

On Friday, the 22d of June next, will occur the two hundred and fiftieth anniversary of the landing of John Winthrop on these shores. It is proposed to hold the first Field Meeting at that time. Robert S. Rantoul, Esq., has accepted an invitation to deliver the address; Miss Lucy Larcom to prepare a poem. Other gentlemen will be present and take part in the exercises of the day, and it is hoped that the occasion may be a successful commemorative event. The meeting will be held at the Pavilion on Salem Neck.

ADDITIONS TO THE LIBRARY and the several collections are constantly being made by donations and from other sources. The subject of increased accommodation for the valuable material, so fast accumulating will, ere long, require the consideration of the officers, members, and friends of the Institute; whether the present is the most suitable time to make a general effort to provide means for a fire-proof building is an important question to decide. That the society needs and ought to have such a building, no one will deny.

The TREASURER reports the payment of the generous bequest of the late Wm. B. Howes to the Institute, and makes a clear and full report of the finances.

In concluding this retrospect of the doings of the Institute during the year, it is hoped that these annual exhibits, of a steady and healthful growth in the right direction, and of a gradual advance in the promotion of its various objects, will secure the respect and good wishes of the community at home and abroad.

MONDAY, MAY 24, 1880.

MEETING this evening. The PRESIDENT in the chair.  
Records read.

Mr. EDWARD A. SILSBEE gave

AN INFORMAL TALK, ON SUNDRY ARCHITECTURAL  
AND ART TOPICS.

Coming from Boston there is an old house standing alone in a beautiful open spot sloping to the water. It is very old. Like the venerable men who came down to us from a former generation, this has descended from many. It is refreshing and unchanged in an ever-new land. Long may it remain. I look upon it with affection. Two centuries speak through it. It takes us back to witchcraft. Its black color the winds and weather have painted. It is flat on the ground. One massive chimney is stacked in the centre, clustered in masses and solid as the earth. It is simple as a Doric temple and not unworthy as a human record to stand beside it. The bleak centuries have howled about it and raved, life has gone on there and it has threaded its way to our time. Fire has spared it.

Bare, bald, unornamented, these houses are like monuments of the past. They plead with posterity. They seem to say to us: "Disturb us not, respect old age." It touches us with pathos. It is a voice of Pilgrim days, of Indians, of Quakers, a new continent, a worthy beginning when life was barely lodged here and struggling for a place to plant itself, and the nation was young and civilization new. The Indians saw its raising. The Pilgrim struggled with the savage. Where there are so few symbols, such a paucity of relics, and the centuries are so rare, indeed, we cannot afford to neglect them, these old

houses. They are our century flowers, as the mediæval cathedrals are Europe's and as significant, in their way, of the stern unconquerable faith that brought them here.

I insist upon them for they are memorable to the eye and to the feeling.

One catches me, as I go to the Beverly station, with its impressive bulk, and one huge chimney showing above the trees. How they reproach the puniness of later times, monoliths, no one divided their mass or exhausted their simplicity. A history and character are in them, they are gothic. Our life is raw enough, and new, and needs to be tempered by the past. Character is like geology, the world is built into it. Where we have so little old, what with constant fires, and changes, and building over and over on the same spot (it seems as if the American resented an old thing, or were ashamed of it; and inside our houses, what woe our women do)? we should preserve what we have. We need it in our bustling modern life. Every appeal the past makes is refining, humanizing. It seems our buildings are tents from which we remove as easily. The American is a kind of Bedouin for shiftiness of place. The past is obliterated ruthlessly.

One cannot exaggerate their impressiveness. The puritan might come out of them to-morrow. They are the only mementoes we have. Two hundred years old! what else have we so old as that? Why, everything is five or fifty years old here at best! As expressive are they in their homely worth as the cathedrals of their enriched and stately worship. The tooth of time has gnawed at them in vain. They feast the eye and repose the mind. The slope in front is dotted with apple trees, itself a curly dot. This busy sturdy tree is just like the people, and of most expressive growth. Like a bustling housewife, it has a domestic air, like fowls—a barnyard tree. It seems to belong to the house, to be one of the family,



no tree comes so near to us ; there is thrift in every branch. It has something to do. It is not idle or lazy like the elm, for dawdling and showing off. Well, that's better than the weeping willow, a pure bit of sentimentalism in nature. The elm is another type, very varied, sometimes great and noble, more often scrawny, coarse and rank, of poor foliage and vegetable growth, not well knit, forked rather than right-angled, of a feathery plummy shape, not appropriate for tree form. It is like our thin sentimentalism and rage for effect. We are not yet knit in the fibre of maturity. The elm has not half the character of the apple.

This house of which I speak is at the entrance of Revere, to the left. Coming through the town there is another on the same side of similar age. Here is a chimney of very pretty design, terminating in two pierced or looped pinnacles with a solid member between.

The situation and the ride altogether are lovely. Hills of exquisite slope, mild declivity, as Byron says : fair, wide-stretching views open as the sky, an unoccupied country ; the ocean peering in the land ; thicketed rocks, purple crimson-stained meadows, salt grass, and the sturdiness and strength of things seize you like a passion. Salt marshes season our very bones.

There was poetry in the old scattered colonial times, though nobody has found it out. Hawthorne is too subjective, introspective to do it justice. He would deck it out in colors of romance which it will not bear. We need a Walter Scott with homelier touch, and a simple objectivity and picturesqueness. It is the ocean and the land at play which produce this coast about Boston, as if they dallied with each other, and did not know which was which, and were locked in sweet embraces. No lovelier mingling of marsh and hill exists.

These houses are apart from all other periods. They

brought the feelings which originated them with them. They root themselves in the ground from which they grow. The mass is a simple unity. Nothing has been done here so severely full of character. They are the earliest and best things in design the country possesses. Doric in simplicity, Gothic in skyey feeling, the vast slope of the roof makes a splendid line of continuity. Nothing in Europe is finer than their simple expressiveness and detached character. They grow from the soil. This was gothic feeling, to begin from the ground. It plants itself like a tree or a mountain, and clasps the soil in which it roots itself. Classic is lodged, superimposed, and has no principle of growth, nor is it so near to the earth and representative of it. They are large, at least in effect—Doric did not depend for its grandeur on size—majestic. They hold us by a spell of the imagination like early records. The imagination wants a background in which she can paint something. She is worried in the present. They are generally isolated, or were originally. They were generous of land in those days. They rule the domain, are emphatically mansions of a primitive type, boulders from a mightier past. Like the grim towers and castles of the middle age which lie like a vast skeleton over Europe, they reflect another age. The baths, the bridges, the huge amphitheatres scattered over southern Europe and along the Mediterranean are the mastodon of Rome—an extinct species. The pyramids, like mountain tombs in a desert land, are the bones of Egypt. The age they represent is gone completely as the feudal time. How finely were they in character with that great man the puritan.

It is mass makes architecture, and proportion, the arrangements of it, and the cunningness of line and parts. This great lean-to is like a hood to the house, as if it

were drawn over it to cover it, and looks marvellously comfortable smothered in storm as they must have been in those days, and away from neighbors. Like an ark, it shelters from winds and weather. They are the only tender memorials of the first primitive time we have. There are no graves. Whenever I see one of these houses I am carried back two hundred years in a twinkling, transported out of this present and landed in the dim past. Can anything else do it for us here? does anything else?

Walking the other day in North Andover, I was delighted with the design of a chimney. In that house the inmates were scalped by the Indians. An architect had stopped the previous season to sketch it. Richly clustered it was like a bit of gothic times.

A hundred years passed, the colonists were rich. Ornateness came and social charm. The houses were still flat on the ground, and the lawn came in at the window. There was much dignity preserved and breadth to the end of the century, and then character passed out. Houses were perked on underpinnings and no sense of design left. They were comfortable, but not architectural. The time of the Hancock house and Pickman house, in this town, was the first ornate period and the best. It seems to me there have never been houses here possessing more quiet dignity and charm. They were fifty feet away from the street. A rich scroll ornamented the ample doorway, and often a leaden image between. How this fascinated the boys! The massive knocker did away with the vulgar tintinabulation of bells.

The pineapple house on Brown street was my boyish landmark, and how sweet and tender that house still is, put by in a side street. In 1810 the houses were ten feet from the street, and one approached them by flaring stone



steps. Imposing as this was, it was not domestic. The old charm and rusticity of placing had gone. They still build in England on the grass and always have. Why we, who have the drier climate, should ascend into the air I cannot tell. Perhaps the snow banked against the wooden house rotted it, but they did not find this out for a hundred and fifty years. At any rate it ruins houses for beauty to place them away from the soil, the grass, the shrubs. These should nod into the windows and bower the porch, as if they belonged to the family, and the sweep of lawn and floor should be one—at least for beauty and sentiment, and I believe it can be reconciled with health. In 1800 the house of Judge Endicott was raised but it is still away from the street. A beautiful doorway and sweet house next Mr. Willson's church, down street, was raised in the same way; the roofs of these houses were full of cheer; much may be made of roofs. They are in themselves an architecture. How they disappeared afterward; nothing was made of them until these late years, when they have been overdone with no correct pure feeling. Walking along the delightful old streets of Salem, or any similar New England town, this feature, with the benignity of it, and the tender placing on the ground, charm one. How vulgar the later building, gingerbread ornaments, bed-post details and designs turned out by the lathe!

Until, in these late years, education is ridding us of this display of cheap commonplace; but now the architect runs wild with us, as formerly the builder. Breadth, proportion, repose, we rarely see it now as it prevailed to 1800—simple dignity. This has given way to such countless variety of styles that I hold it a reproach to architecture, that it never does anything of its own but constantly reproduces, imitates, selects. In their day the styles suf-



ficed, and expressed something, the feelings of the occupants and the time. Now we are Chinese or Peruvians in the same breath. Architecture cannot be a living art when it chooses so widely. They could not build but as they did in the good periods. They knew nothing better, or other.

Salem was fortunate in possessing one architect of great merit at a later date. Macintire had the genius of the renaissance. His designs are most refined and delicate. He has left the best church of the steeple spire order that can be seen in New England. This is the one in Chestnut street. The fine steps have been taken away and the door injured. A charming design was the house of Mr. Rogers, opposite the market. The upper part is still beautiful. The Assembly house in Federal street is another. The old common gates were very stately, and showed true style.

There was a period of Doric taste, Tuscan Doric, which has left admirably proportioned roofs and noble porches. The Stearns house has one, and there is one in Chestnut street. These are the sifted results of centuries of architectural feeling. Wherever one has attempted to replace them with other designs or proportions one has made a sad bungling. These old styles, if once meddled with, are ruined. Such was the case with the Boardman house, built by my grandfather, opposite the eastern gate of the common, once excellent for porches and proportion. The proportion of the roof remains. General Washington was astonished, on his visit to Salem, that a sea captain could build such a house. In those primitive days it was the largest around the mall.

As an illustration of the styles, and the contrast they present, the imaginative significance of them, it is instructive to study two late churches in Boston, the one

in Arlington street and the other in Berkeley. The one is composite, the other gothic. The Arlington street is a very poor production in its own style, has no just proportion nor elegance and is a clumsy copy of St. Martin's In The Fields, in Trafalgar Square, London. The steeple spire can never have much inspiration in it though it may have elegance. Spires are gothic. They are the fine fruit of its aspiration. Gothic is a thirst, a climbing, an aspiration. Great interiors, with ribbed and bended roofs, are like hands folded in prayer, and stretched to heaven. Every moulding is an emotion, pinnacles are ecstasy, niches are psalms, shafts are anthems, stained glass the heaven itself, sunset or the dawn. Gothic is like soul in style, classic mind; the one poetry, the other prose; gothic feeling, classic thought. One is of heaven, the other earth. However broken, the snatches of it enchant, like strains of music. As a natural vegetation, it entwines, shoots, and embraces. It is mysterious, exuberant, unending. It is like a monument to nature built by man. In no other style has the spire a *raison d'être*. Others are piled up, imposing, but not inspired. Grace, majesty, proportion, design, do not supply this motive of soaring, vaulting growth, and piercing exultation. They are cold. Gothic is as multitudinous as nature. She might have done it herself. It is like three centuries of Shakespeare. In its greatness, all men's lives were in it, and all their lives. Other styles eke out their outlines with clumsy expedients, urns, and vases, and knobs. Gothic produces every part out of every other part, naturally, as nature works. It is evolved, integral, fused. In other styles ornaments are lodged, attached, in this they grow. One is constructed, the other lives. Composite styles miss the inevitable, as Wordsworth says, Goethe's lines do. They have descended from ancient times, and nothing akin anciently

had place ; no feelings of mystery strove and struggled for expression, nor were they possessed with the passion of the infinite, which is the principle of gothic. Faith did not flame in the air. The earth sufficed, and they symbolized it. All notes of action seem natural to gothic. The members multiply, cluster, divide ; they mantle, reach, rush, throng and cling upward. It was the literature of the middle age. The people read in it, as in a book ; their sanctuary and catechism. Religion is in every turn, and twist, and point, and pinnacle ; and so was life. It is fervid, swift, kindling, and has well been called frozen music. It has a unity like faith itself. It is embodied religion. Nothing touches us like this ecstasy and prayer that it is—a message sent to heaven, pointing to the other world—so impassioned, it cleaves space as if it would get away from the earth, and longed for some other sphere—its sempiternal heritage. Its coignes of vantage ensnare the mind.

Now all this is seen in Europe when we study cathedrals, and compare them with the studied styles. One comes with this impression, and applies it to the opposite orders here. There is sufficient ground for the distinction and significance, or lack of it, in styles, if we compare the two churches named, which constantly catch the eye every time we cross the open spaces in Boston ; and they force themselves upon the attention. The evening sky makes all beautiful. A radiant atmosphere spreads, and they all point into space, or lift themselves, with one common sentiment of serenity and adoration. In cooler moments we observe their excellences and defects. Campaniles have added a new feature to the city, and the Venitian architect has enriched it with the poetry of styles. It combines the repose of classic with the warmth of gothic or flowingness, the life and verticalness. All is curve, yet

it is playful, elegant, graceful and not thin. Balanced, it touches with sweetness and rhyme the prose of other orders. They seem cold beside it. Surely no other façades crowding a city ever held one as Venice does. One wanders in it as in an enchanting place, lifting itself above the water, as it does, where everything enriches by contrast, as if it had been created above the sea by the curve and impulse of its wave, restrained and fixed in laws of beauty as nature herself works. We are never tired there of the order. It is too beautiful to satiate, and it is elegantly distributed and changed. Infallible laws governed Gothic, as they did Greek, and both partook of nature at the source, each in its own kind. Every time one passes a Venetian front here, one is stirred, a strain comes over one, and the eye kindles, and the feeling is touched. This is the case when we come upon that angle by the common where the group of the Boylston house and the next building stands, and compare it with all other styles; or simply view a touch of the incomparable arch and grouping wherever it is applied, and used tolerably. Like Venetian painting, it was the sole creation of Venice, and it has never been surpassed. The wondrous city created two things, its architecture and its painting, and it left literature aside. It was like a radiant bridge from antiquity to the present time, impinging on the East. The works of Mr. Cummings, adapted here, not always equal, have planted this noble style, and they are the most imposing civic things in the city it seems to me.

OF INTERIORS: — They are ingenious and overcharged, as in literature Tennyson is oversweet, Browning over-rough, Emerson overpithy. The great style has repose. *Le défaut de ses qualités*, as the French say. We are suffocated with bric-a-brac, tortured into picturesqueness. Gothic has been let loose in the house. We sigh for the



relief of older styles before mankind became graphic. Beautiful objects, beautiful ornaments should be kept in place. It is an *embarras* to have too much even of a good thing, to live in a museum. We cheapen all these things by heaping them, and displaying them. The eye is wearied, the taste surfeited. To live with such distractions is a mistake akin to being always in romantic spots, picturesque situations, the sublime, rough, wild or savage. It is not for constant contemplation. The mind wants simplicity to dwell with, and nature in her every-day, her morning gown. Grassy sweeps and turfy banks, trees, flowers, shrubbery, and quiet dells and nooks. It strains at the sublime and unusual, and is not always in a mood of the picturesque. On the Beverly shore I prefer the smooth places with roughness near. Nothing gives such quiet satisfaction as grass, lawns, shrubs, habitableness. A barberry bush is well enough, only not to live in. They pall upon us. They are not for every day, and at all hours. There is delightful invention, the architect, the decorator have all been at work. We are not left alone a moment. They are alive all about us. It is charming, what they have done to beguile monotony of its dulness, tameness of its insipidity, and to stimulate surprise. They besiege us, they must show off their hand. This will settle down at last to some recognized styles having unity and principle in them and repose. Now all is heterogeneous, one almost says, mongrel, hybrid—ornament at all hazards. The world never saw such a chaos. Whims are flying about like flies. Yet it is very delightful in parts, and the freshness and independence are hopeful.

OF MONUMENTS in Boston, this may be said, the largest and most important is the cheapest commonplace. Borrowed from a poor and late clerical monument at Rome it worsens that. The figures are meagre, not monumental;

the ornament—eagles, bands, wreaths—of the stalest. It is a splendid position. What an opportunity lost! The surmounting figure cannot move for her clothes. The artist's Glover is better and alive, and has force, mastery. So the horticultural hall decorative statues are good, being adapted from antiquity. The other figures in the town are feeble enough, or tame—Sumner, Quincy, Webster, Everett. If Lincoln is better, the group lacks composition and design. The Washington monument is a tame-trotting, picture-book horse and man. There should be in all monuments a certain fire, force of character and inspiration. It is like writing an ode, you cannot fail, you are lost. If you attempt the heroic you must be equal to it. A monument is a lyric, a commemoration, a poem; there must be some touch of enthusiasm in it to make it a success. It is an ambitious effort. It strikes a high key, the art should respond. Simple representation and historic portrait, unless done with cunningest hand, will not do. The best things in this kind are the two statues, one of Sophocles and one unknown, in the Naples and Lateran museums, and the Demosthenes (casts are in the athenæum), and Frederick the Great at Berlin. These have that intense seizing of character with heroic feeling, like Titian's portraits. The same passion is lacking in this monument of Washington, that we miss in poetry here. Of Milton's three words, two are wanting, sensuous, passionate. The pedestal is thin. It has that fatal quality of commonplace. Yet it is vigorous in parts, far removed from vulgarity, and a dignified work. As to portrait statues, the worst I have seen, are the buckram men in bronze put up outside of Westminster Abbey. We cannot have genius every day, and sculpture is scarcely a living art in any representative or vital sense. It only deals in portraiture with any success. The command of the figure

is rare. Ward seems to have it, but he strikes us as lacking refinement and ideality. It is a good piece of work of his above the ether monument. Instructive it is to compare this monument with the one on the common; as instructive as the two churches are in sight from these points of view, the Arlington, the Berkeley street; in each case to show excellence or defect of style. The ether monument seems to want freedom, and is technical, as the other lacks all education and design. No one can pass the two churches without seeing the grace and feeling of the one, and the parody the other is of all grace and proportion. It simply mocks the gothic with ugly parallels.

Among the old things, are the wooden images, which used to be in Salem, elegant, rustic, graceful objects. One remains in the Derby house grounds nearly opposite the City Hall. These appear to have been Italian in sentiment, and are like much existing in Italy now, and which always has existed there since the Roman times, and the Greek and Etruscan before it. That country loves objects out of doors and against the air, and one said once there were more statues than men at Rome. They are dug up as we dig arrowheads here, the relics of the former inhabitants. There is iron work too, and excellent old fences of stately and ornamental design. These are the lost styles. They have a true interest as the old furniture has. How much they spoke to their time and represented it! How much elegance there was in them, refinement and taste! Stately often, imposing and chaste. Wainscoting, panels, cornice-work, beadings, majestic sweeping staircases, and landings like a palace, embayed windows, window seats, balusters, scrolled, of fairy lightness, and rails that curved, descended, crooked and twined upon them-

selves. In Mr. Peabody's house in Danvers, we cannot believe we are in this century. It is a bit of colonial England, and still transports us to the mother country. Later, style was lost utterly for fifty years.

There is good iron work down Central street, and in front of Dr. Cate's house. One fine fence remains by the Osgood house in South Salem. Posts remain elsewhere of beautiful design as at the Baldwin house. How important these things are, and what effect they have upon the imagination, especially upon childhood, let us measure by picture books. They are a living picture book. Micklefield's Indian, and the image over the Pickman house door, the wooden images on the Crowninshield farm in Danvers, and the grotesque carving over the engine house there, the carving on the upper common gate, the pine apple with its bright imitative color, the figures in the Derby-houses' grounds, and the carvings on Macintire's works,—slender in amount as they all were, were to a Salem boy forty years ago what St. Mary's Redcliffe was to Chatterton, they created him and enriched his imagination. Hawthorne need not have complained of Salem, nor James for him. Had he been born in Lynn, Lowell, or some other fiercely new American town, he never would have been Hawthorne. Essex county, out of the vortex, and from its old stock, history and wealth, has had more genius than any other county; and Salem at this hour with this Institute, and in some measure through it, has more the ripeness and tone of the old world,—maturity, ease, taste and comfort, and leisure and repose, and what they bring, — than any other town.

Boston now is getting filled with open air statues and monumental work, which, to the boy, will inspire him with historic suggestion and imaginative delight. Our hitherto bare life of the last half century is getting artistical.



Coincident with this disappearance of styles inside and out, was a decay of manners as a fine art. We shall have to study them anew. The younger sort have all their own way, the older are not seen.

A pretty style of house and ground was the old end-wise house. Of these there were charming examples, Judge White's, Mr. Bancroft's, Dr. Prince's and many others. How sweet the grounds showed in front of them. They were frank, and let the public into all the family enjoyment and confidence. Many still remain, and they are among the distinctive features of old towns.

THE PORCHES are among the sweetest bits we can see now, where they have not been altered or replaced, when they are sure to be ruined. Not one has been added in modern times that is not crude and shapeless. You might as well attempt to alter an old table or chair of the good periods, and give it another crook or design than what it has. The sense was lost, and we wandered in a sterile vacancy of design, and of heaviness and enrichment without beauty, both as to house fronts and porches, window headings, fences, roofs, doorways, and especially furniture, for fifty years. Two old brick houses interest one. One entertained Washington, (the late Mrs. Saunders remembered being in the cotillion with him there), the house of Dr. Fiske. Here the ground or base moulding told an architect the other day it was the same period as one of the early halls at Harvard College. The old Derby brick house in Derby street is more like a bit of old England than anything in the town. Beverly has charming bits. The refinement of the old manner, the educated ornament delights one precisely as old furniture does. It has an elegance, a chasteness, a sobriety, a salience and reserve, not being overloaded, a variety withal, that hold one by a kind of spell of interest and fascination. The horror of later things in wood had not arrived. We have been overrun

with the cheapest of quack styles, as the country generally has. It would not do to specify them. Upper Essex street, Federal street, Beverly, South Salem have much to show. The good house of Mr. Cox built early in this period and interregnum, Mr. Lee's, and one lately put up at the corner of Norman street, are a protest and relief. Certainly it is earnestly to be desired that we should do better in wood than we have done. Meantime, in this town, the old houses quiet the very feeling, and appeal pathetically against the intervening time. The house of Mr. W. H. Foster has charming steps in threes, and excellent old finishing touches, with extreme simplicity. One might enumerate many a refined bit and shy old house in Salem and Beverly. There is a noble one as you go to the cove, in the latter town, of square shape, ample dimensions and double porches, and where one is reconciled to white paint, and beside it a dear old veteran that wants to go into the ground, and has almost gone there, it is so old, and they both are expressive, to a degree that shames modern structure. They stand coquetting with each other and are monuments of centuries, impressive as time itself, and eloquent with character, and mass and sentiment. Hawthorne might write a romance about them. They are worth a whole modern town.

THE JAPANESE, half-women in organization, have the sensibilities of Eastern races to color, and the harmony. Cashmere shawls, Chinese porcelain, illustrate this. An island like England, of about the size and population, on the edge of a great ocean, in the temperate zone, at the same distance from the equator on the other half of the globe, and bordering a continent; feudal too, with beautiful nature, and the same love of gardening, there is the same sensibility in their little art as in the English poets'. Their delicate feminine hands have a perfect manipulation.

Emerson says, in his *Humble Bee*

“All was picture as he passed.”

This is true of the Japanese. They get a subject out of nothing. In a collection of ivories at the Burlington Club, there seemed an epitome of human life: nature feeling, art feeling, poetic feeling, the grotesque, gothic creativeness, the sentiment of Dutch pictures, incident,—a world in little, a Shakespearian range. We have only to examine fans to see their sensibilities to the impression. In my last talk with Mr. Hunt, I saw how much he was drawn to Japanese, and in the beautiful Gloucester harbor I think I see the influence of it. They have naturalistic feeling as the Greeks had design. They have changed ornamentation everywhere. A friend of mine, who has a collection gathered on the principle of poetic motive, tells me, he never takes a walk, but he sees grasses and weeds, and a hundred aspects of nature, Japanese have taught him. Whether this virginal island will now be destroyed for *naïveté* of motive and unspoilt feelings, remains to be seen. The Greeks when they lost their great art were conquered. The Japanese are springing on.

Since I was last here we have lost Mr. Very. A genius, as rare as Hawthorne, suddenly stopped in his early years. It is the quality of his work that transmits a man. The only analogue I can find for Very is Fra Angelico. No two men were ever purer-hearted, and so consecrated. It made their genius. Fra Angelico is worth whole ages afterward. Corot illustrates this. He outweighs the whole American landscape. Gray is the truest poet of the last century. How little he wrote! Very may remind us of Blake too. Spontaneity is the secret of genius. In Wendell Phillips' speeches, in Miss Preston's translation of *Mirëio* is this quality. It is as easy as breathing. The old diction is very threadbare.

Emerson in avoiding it rushes into the other extreme. It is an inspiration from temperament as Hunt's was. Fra Angelico was very limited, but he was divine. This golden thread of passion makes Parson's verse distinctive, and gives him grace—a quality we have not had. Religious poetry is usually valueless as literature. The didactic is not an inspiration in art. There are two or three notes of earnest poetry in New England by women. It is natural the genius of New England should take that turn, and that it should be through women. After fifty years who has grown? Shelley, because he lends you his soul to see with, and his art was equal. As the soul writes through Very, nature wrote through Shelley. If it is the west wind he writes about, the west wind writes it. If Very describes the columbine, its slender grace and tremulous nature are in the verse. He seems to me to be worth bushels of American poetry. When I was entering the bay and Dean Stanley was aboard, I pointed out Salem to him and told him I would give him the volume, now out of print, of his early poems; so I did when I got back to England. Mr. Very himself gave me the book with his name in it. Two days after we landed, Mr. Very was present at the hall. I crowded into the gallery at the last moment, and could see him on the floor of the house. I noticed his very intellectual head. There was no such head in the audience. So high and such fine lines. His things must grow. He is a quiet genius but unique, the least indebted, the most underived. American poetry is a dreary second-rate, it has struck out no new note. But such poetry, the pure effluence of the spirit, never can be popular, or even comprehended or felt by the many. I think of Daniels' lines quoted by Coleridge:

“Unless, above himself, erect himself he can,  
How poor a thing is man!”



NOTE.—REV. JONES VERY died at his residence on Federal Street, Salem, on Saturday morning, May 8, 1880, after an illness of a fortnight.

He was the son of Capt. Jones and Lydia (Very) Very, and was born in Salem, Aug. 28, 1813. In 1823 and 4, he accompanied his father on the last two voyages of the latter to Europe. He graduated at Harvard University in the class of 1836, with high honors, and was a Greek tutor in that Institution in 1836-8.

The following extracts from two letters may appropriately be inserted in this connection. One from Mr. Very to Mr. Conrad incidentally gives a clew to his own college habits. He writes:—

“He (Chisholm) was a member with Thomas Barnard West, of Salem, and myself, of a small society for religious improvement, which held meetings once a week, during most of my college course. I remember these meetings with great satisfaction as hours well and properly spent; and I doubt not that they were so remembered by all who participated in them.”

The other by one of his former pupils, received by the family on the day of his burial, shows the estimation in which he was held as an instructor, who writes:—

“You were my teacher of Greek in 1837-8, and your manner of instructing made a favorable impression on my mind, and produced a leaning to that language which still lasts. You were unwearied in drawing our attention to tenses and making us translate literally—two important points in learning languages of which however Mr. F \* \* \* \* quite lost sight. The charm with which you surrounded Greek vanished from Harvard with you. You felt the spirit of the Greek people, and were ready to communicate it to such as had ears to hear.” \* \* \*

He studied for the ministry and was approbated as a preacher in 1843, though never ordained over a society or settled as a pastor, he had occasionally performed the clerical duties.

He had acquired distinction as a poet, especially as a writer of sonnets and occasional pieces, some of which were contributed to the papers and periodicals. In 1839 he published a volume of Essays and Poems, which has been considered a book of great merit. Griswold, in his Poets and Poetry of America, says, “His Essays are fine specimens of learned and sympathetic criticisms; and his sonnets and other pieces of verse are chaste, simple and poetical.” His deceased brother, the Rev. Washington Very, and his sister, L. L. A. Very, shared his poetical talent.

He was of a quiet, reflecting and sedate turn of mind, and, though retiring, was very affable and companionable. He early gave himself up to a religious enthusiasm, which so possessed him that he left Cambridge and returned to Salem, where he had since lived in retire-

ment, writing sonnets when the mood seized him, but taking no part in public life.

The family is traced back to *Bridget Very*,<sup>1</sup> who came from England with her two sons and a daughter, and who was a member of the First Church in Salem in 1648. She and her son Samuel<sup>2</sup> lived on the north side of Cedar Pond, near the Danvers almshouse, where they owned a large tract of land, and where her descendants resided for a century or more. Many of them removed to Salem and became shipmasters.

In the first volume of the Historical Collections of the Institute, is an interesting account of a genealogical ramble by the subject of this notice. He says: "that it [the land] bore the name of the Very lot. I was shown by an aged man, the cellar where the first house stood. No house had been there since his recollection, but the stones were still there overrun with blackberry vines. There too was the well, covered now by a stone. A few old moss-covered apple trees in the midst of a new growth of oaks and pines showed where, two centuries ago, the strong hands and brave hearts of the early settlers had cleared the land and made them a home."

*Samuel Very*,<sup>2</sup> born in England about 1619, married Alice, dau. of John Woodis, Woodhouse or Woodice, had:

*Benjamin Very*,<sup>3</sup> married Jemima, dau. of Joseph Newhall, of Lynn; had:

*Isaac Very*,<sup>4</sup> born July 30, 1715; married Elizabeth Giles in 1736; a corporal under Col. Ichabod Plaisted in 1756; died at Sandy Hook in the army, 1778; had sons Isaac and Samuel.

*Samuel Very*,<sup>5</sup> born in Salem, Dec. 10, 1755; married in 1776, Hannah Putney. She died Feb. 4, 1799. He was a master and owner of a vessel, but kept a store many years in Salem at the corner of Essex and Boston streets; died in 1824, aged 69; had: Lydia, born June 14, 1792; married her cousin Jones Very, and was the mother of the subject of this notice.

*Isaac Very*,<sup>5</sup> born in Salem 1745; married for his 3d wife, Rachel Jones, of Charlton. He resided some years in Charlton and Spencer, the latter part of his life in Salem; was master of a vessel and an officer of the Customs, Salem. He died in 1831, aged 86; had:

*Jones Very*,<sup>6</sup> born in Spencer, Mass., Nov. 17, 1790, and followed the seas from early life. As a shipmaster he sailed in the employ of the Hon. William Gray from 1817 to 1821 in the Brig Concord; from 1821 to September, 1824 in the barque Aurelia. He married Feb. 13, 1813, his cousin Lydia Very, above mentioned. He resided at the corner of Essex and Boston streets, in Salem. He died Dec. 22, 1824.

[Ed.]

REGULAR MEETING, MONDAY, JUNE 21, 1880.

MEETING this evening at 8 o'clock. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

The PRESIDENT referred to the sudden and unexpected death of an associate member, Mr. Caleb Cooke, which occurred at his residence in this city on Saturday evening, June 5, 1880. His disease was typhoid fever, and it terminated fatally after a confinement to the house of a few days.

The PRESIDENT then alluded briefly to some incidents in the life of Mr. Cooke, his interest in scientific pursuits, his labors in the cause of science and general culture, and his acts of benevolence so freely and cheerfully done.

Mr. Cooke was the son of William and Mary (Fogg) Cooke, and was born in Salem, Feb'y 5, 1836. His father was a mariner and for several years was an officer on board of vessels engaged in the West African trade, and died in California when the son was in his boyhood. He was educated in our public schools and commenced his active life, a clerk in the bookstore of the late Henry Whipple.

Continuing in that situation for a short time, he retired, and after spending about one year with Mr. George F. Read, in the study of the languages, especially the Latin, he devoted himself principally to the pursuit of Natural History which had long been his desire and inclination.

He was elected a resident member of the Essex Institute May 11, 1853, and was connected with that Institution until his decease, and for more than twenty-one years of this time he held some official position or a membership

on some important committee. For several years he was a pupil of Agassiz, and under his tuition pursued his studies with a class of young men who have since distinguished themselves in zoölogical and geological science.

In 1859 he went to Para, South America, and subsequently to Zanzibar and Madagascar; on the latter voyage, sailing in the barque Persia, from Salem, Nov. 5, 1860 and remaining for several years on the eastern coast of Africa, collecting specimens for the Museum of Comparative Zoölogy, Cambridge. He was compelled to leave this field of his labors on account of sickness from the African fever, but almost recovered his health during his passage home. While he was absent, Prof. Agassiz and Senator Sumner procured him the appointment of U. S. Consul at Mozambique, but the Commission passed him in transit and he never acted under it, although his name was borne upon the rolls for several years.

From the organization of the Peabody Academy of Science in 1867, until his death, he was an assistant, and one of the Curators of the Museum under its charge.

He was a member of the American Association for the Advancement of Science and also of the Boston Society of Natural History.

In 1875 he assisted Dr. G. M. Levette, of the State Geological Survey of Indiana, in a hydrographic survey of a dozen or more of the lakes in the northern part of that State, where his experience in the collecting and preservation of specimens of natural history, and in seining and dredging, was of great value.

He also became greatly interested in the work of the Salem Fraternity, organized in the spring of 1869, and was active in the establishment of its library and reading room, becoming chairman of the committees of those departments, and devoting himself constantly and earnestly to the welfare of that institution. He possessed many



admirable traits of character. No one was more ready to communicate information, or take more pains to confer a favor than he. He was a useful man in the line of his specialties.

Rev. E. B. WILLSON spoke in the highest terms of Mr. Cooke's labors in behalf of the Institute and of the Fraternity, and also of his many marked personal characteristics; frank, hating cant, impatient of conventionalities, sunny tempered by nature, but quick and of variable moods, he scorned wordy goodness, and called for deeds before his confidence was to be had. His valuable services in the management of the Salem Fraternity were particularly alluded to by Mr. Willson. Almost from the beginning his hand was in it, and as the zeal of others slackened, he only gave to it his more constant care. Every day he devoted hours to it, especially during the week-day evenings; these were the leisure hours from other pursuits which were his main business. His heart was in the work. Something new to be tried was always seething in his brain; more library room; more books; more periodicals, papers and pictures; another room for women, more workers on committees; more work for the workers; but he went first himself, and staid last. On the steady band of workers that has carried on the Salem Fraternity for these eleven years, his death falls like a momentary faintness which darkens the eyes to the way before them.

Mr. JOHN ROBINSON spoke of the long personal friendship which had existed between Mr. Cooke and himself, and particularly dwelt upon his pleasant and kindly ways, always seeking to do a favor before it could be asked of him. He spoke of his fondness for children, and the ease with which he made them familiar with him, and related an incident which occurred only one week before Mr. Cooke's death.

It was customary every year for them to go to a certain choice locality where the *Arethusa* was particularly abundant, to collect the flowers and astonish their friends with a profusion of the blossoms of this beautiful and usually scarce plant. The trip was generally made on foot, but as the distance was nearly ten miles and it was desired to return before noon of the day selected, a carryall was obtained, an early start made, and two little girls taken to fill the spare seats. The flowers were found in great abundance and in a few hours the party were on their way home, Mr. Cooke and both little girls on the front seat. All the way the children were particularly merry, and Mr. Cooke merrier if possible than they. All sung, laughed, and drove by turns, and when nearly in town, it became necessary to quiet the fun lest it should too much surprise the sober passers-by. Mr. Cooke never was happier, and had not for two months seemed so well. The same *Arethusas* were not all faded the day he was laid in his grave.

Mr. Robinson spoke of the public loss caused by Mr. Cooke's death, and said that his long familiarity with the specimens and customs at the Museum of the Academy, would render it impossible to fill his place as he left it. But beyond this, Mr. Robinson said he felt the personal loss to be greater, for Mr. Cooke was one upon whom he always felt able to call at any and all times for favors or assistance of any sort, with the assurance of an immediate and cheerful response.

Dr. GEORGE A. PERKINS said, that his personal recollections of Mr. Cooke were of the pleasantest kind, his eminent fitness for the position he was called to fill had often impressed itself upon him, and it would be safe to say that no specimen or specimens, in any of the collec-

tions of our scientific societies, escaped his memory or care, and all could be produced by him at a moment's notice. His uniform good nature under trying circumstances, and the pleasure he appeared to take in furnishing any desired information, made it exceedingly pleasant, to recall the memory of the visits, the speaker had made to the rooms of the Peabody Academy of Science, during the period of his official connection with that institution.

Mr. T. F. HUNT also made appropriate remarks regarding Mr. Cooke, his life and work, and on his motion

*Voted*, That the President, Rev. E. B. Willson, and Mr. John Robinson be appointed a Committee to prepare suitable resolutions on the death of Mr. Cooke—the same to be entered upon the Records of the Institute, and a copy to be sent to the family of the deceased.

The following PREAMBLE and RESOLUTION were reported by the committee, and recorded in conformity to the above vote :

*Whereas*, The recent sudden decease of an associate member, Mr. Caleb Cooke, who had been interested in scientific studies from his early youth, and an active member of the Institute since May, 1853, and for more than twenty-one years holding some official position or a membership on some important committee, requires from the Institute a grateful acknowledgment of his valuable services so cheerfully and freely given, at all times, in the promotion of the objects of its organization.

*Resolved*, That the Essex Institute desires to place upon record this testimonial of respect to the memory of its late associate, whose ardent zeal and indefatigable labors in scientific research, and especially in various acts of benevolence and general culture in this community, have secured the esteem and respect of all, and will cause his name to be long remembered in this, his native city.

BULLETIN  
OF THE  
ESSEX INSTITUTE.

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NOTES ON THE FLORA OF ESSEX COUNTY, MASSACHUSETTS, WITH SKETCHES OF THE EARLY BOTANISTS, AND A LIST OF THE PUBLICATIONS ON THESE SUBJECTS.

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BY JOHN ROBINSON.

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ESSEX County offers to the botanist a field attractive and interesting in many ways. The open country, deep woods, and numerous swamps contain the usual number of species found in such localities, while a large river, the Merrimac, furnishes a valley in which grow many plants not elsewhere found in the county. There are upwards of fifty ponds, from four to four hundred acres in extent, rich in water plants and subaquatics. Though there is no considerable hill or mountainous district, it is sufficiently far north to have several representatives of higher latitudes and even a few alpine and sub-alpine species in the flora.

Along the seashore is found an abundance of plants peculiar to the region of salt-water marshes and beaches, while in the ocean and inlets grow about one hundred and



fifty species of algæ. These last named collecting grounds offer an opportunity to study, from fresh specimens, classes of plants from which the inland botanist is almost wholly debarred.

The land plants of the county belong decidedly to the northern flora although not so arctic in their character as the lichens and algæ. There is an almost total absence of many species common from Cape Cod southward and often found just south of Boston. In contrast to this the *Magnolia glauca* is still quite abundant at Gloucester, but not found again north of New Jersey. At Cape Ann is the southern limit of the little *Sagina nodosa*, and there also is found *Potentilla tridentata*, familiar at the Isle of Shoals and on Mt. Washington. Essex County seems also to be the southern limit, for this region, of *Pinus resinosa* (Red Pine), *Abies nigra* (Black Spruce), *Vaccinium Vitis-Idæa*, *Viola rotundifolia*, etc., as it is the northern limit of *Cupressus thyoides* (White Cedar), *Quercus prinoides* (Chinquapin Oak), *Polygonum Caryi*, *Draba Caroliniana*, *Lygodium palmatum* (Climbing Fern), and others. At Boxford is what has proved thus far to be the only New England station for *Salix candida*, and another bog willow, *Salix myrtilloides*, is occasionally met with. At Andover a locality for *Calamagrostis Pickeringii* was discovered in the summer of 1879; this species has only been known before at the White Mountains. Among the sedges and grasses, plants too frequently neglected will be found, many not heretofore supposed to grow in the county, and a careful comparison of this list with our botanies will show that the range of many species has been extended. Although much careful work has been done there yet remains much to be accomplished; for, besides the few species that may be added to the list of flowering plants, there are many species of lichens and

mosses not thus far collected, and the fungi and fresh-water algæ are purposely omitted altogether. The phanerogams and vascular cryptogams are quite fully studied, and to the Characeæ and marine algæ but comparatively few additions may be expected.

The early settlement of the county renders this a particularly favorable region for the observation of introduced plants. From the earliest settlement to the present time, foreign species have continued to arrive, many of which, like the early colonists, came with the evident intention of remaining; for, as the genista, barberry, white-weed and buttercups show, they flourish here and increase to an extent which it would be difficult for them to exceed elsewhere. The study of these introduced plants might be called historical botany and should not be confounded with the study of the natural distribution and changes of plants. The early colonists came to establish a home: they did not come for gold, diamonds, or lead even, and in coming severed old home-ties and connections. That the fruit and other vegetable productions of the new land were among the first things to which attention was given, the records of early writers amply testify. We are apt to consider the men of two hundred and fifty years ago as a stern company; yet, besides the fruits and plants which might possess economic or medicinal value, this latter use being ever uppermost in the minds of botanical explorers of that day, they did not overlook the curious or the beautiful.

The earlier accounts tell of the gardens that were almost immediately established upon the settlement of the country, and invoices of the articles to be sent to the colonists from the managers in Europe contain such things as the seeds of grains, stone fruits, quince, apple, pear, woadwax, barberry, etc. Besides these, living plants

must have been sent out from Europe, as is shown by the record of "Our Ancient Pear Trees" (Robert Manning in Proc. Am. Pom. Soc., 1875).

Some of these plants purposely introduced have failed to prove of use, or their time of usefulness has gone by, and they have been suffered to run wild, and at the same time a hundred others have like "stowaways" come uninvited. They have been introduced among the seeds of useful plants, in packing material, and as garden flowers. Many of the introduced species still remain restricted to certain localities, and others, although more widely disseminated, are in such situations as to make their origin self-evident, while others are so distributed as to appear to all intents and purposes as natives. Again, by the clearing of the forests, the general cultivation and changes in the condition of the soil, many native plants best able to endure the changes, or those to which the changes have proved beneficial, have been given positions of undue prominence in the flora; while other species, which at the time of the settlement of the country were much more abundant, have now become less numerous, or have entirely disappeared. It is a matter of considerable difficulty to picture to ourselves the country as it appeared two hundred and fifty years ago. It is probable that extensive forests reached to the ocean shore and, excepting the river marshes and clearings made by the fires of the aborigines, occupied the whole territory. The Indians cultivated corn, pumpkins, beans, tobacco and a few other plants. It is possible that some species of foreign plants had been introduced previous to the settlement by the whites through trade or by adventures, but this is uncertain. The study of the introduced plants is aided by the work of Mr. John Josselyn (*New England Rarities Discovered*), a reprint of which, with valuable notes by Professor Ed-

ward Tuckerman, is now available. Josselyn visited New England several times; when on the longest sojourn, 1663-1671, he landed at Boston and soon went to Black Point, Scarborough, Maine, where most of his observations were made. Josselyn was an excellent observer and although his writings are filled with the usual strange stories current in old works upon new and unexplored countries, they contain the first accounts of any consequence regarding the New England flora. This author did not, perhaps, make many observations in Essex County, yet his work contains but few species that do not grow here and its chief value consists in its arrangement and separation of the plants indigenous from the introduced weeds, thus giving what then appeared to be the plants which came with man or, as he called them, "Such plants as have sprung up since the English planted and kept cattle in New England." This, with the occasional observations by other writers, gives us a fair idea of what plants had established themselves here rather more than two hundred years ago. According to Professor Tuckerman, the next date by which the student may fix the introduction of foreign species is 1783, when the list of plants observed by Rev. Manasseh Cutler, of Ipswich, was published (Mem. Am. Acad. Vol. I). Since that date observations are more frequent and the more recently introduced species can be traced quite accurately. It is also quite probable that plants which at one time were quite common weeds have disappeared altogether. Dr. Cutler mentions the *Amarantus* known by the common name of "Prince's Feather" or "Love-lies-bleeding," as "amongst rubbish," but to the writer's knowledge it is never met with excepting in old-fashioned gardens. The *Hyoscyamus niger* and *Artemisia Absinthium* (Wormwood), spoken of by Dr. Cutler and other earlier writers as common in waste



places, are now very rare or unknown. The last mention of *Nicotina rustica* is by Dr. Osgood in 1853, but it is doubtful if he observed it as late as that; his observations were very probably made in previous years, and no one has since noticed it. The introduction of new manufactures is likely to bring with it plants which may be persistent enough in the region where they are introduced but unknown elsewhere. Such is the case at "Tapleyville," Danvers, where, in the vicinity of a carpet factory established forty years ago, are to be found several species of foreign plants unknown in any other town of the county, and perhaps not elsewhere established.

Two or three plants observed along the shore of the Merrimac river suggest a close connection with the mills at Lowell and Lawrence, one of them being a southern sedge. Many plants are emigrating eastward from our western states, travelling as it were by rail. The *Rudbeckia hirta*, now quite common in fields hereabouts, according to Dr. Pickering, did not reach Philadelphia until 1826, and this vicinity until perhaps 1855.

The latest arrival noticed (1878) is that of *Eleusine Indica*, a weedy, oriental grass which is common at New York city and Philadelphia. It has made its appearance along the railroad tracks at the Pennsylvania Pier, Salem, having travelled thence by the P. and R. R. Co's steamers, which regularly bring coal from Philadelphia. This last comes under the head of "ballast plants," a very full account of which may be found in the Torrey Bulletin for November, 1879.

## SKETCH OF SOME OF THE EARLY BOTANISTS.\*

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THE study of botany in Essex County, we may in fact say New England, dates from the time of Dr. Manasseh Cutler at the close of the last century. Previously the plants had only been noticed by writers upon more general subjects of natural history, or casually mentioned in letters written from this country to England. But from Cutler's time there has been a steady succession of botanists, chiefly amateurs, who have kept alive an interest in the subject, even at times making it the prominent topic considered at the literary and scientific societies and clubs of the region. It will only be attempted here to give a brief sketch of the older botanists who have contributed most to the knowledge of the subject in the county.

Francis Higginson, in a letter written from Salem in 1629-30 (Mass. Hist. Coll., I, 121), speaks of the plants which he had noticed growing in the vicinity, and mentions several species which probably now exist in the same localities as observed by him at that early date; one, the *Rubus odoratus* (Flowering Raspberry or Mulberry) still flourishes in the "Great Pastures," and the *Osmorrhiza longistylis* (Chervil or Sweet Cicely) has been noticed until very recently at "Paradise," near Salem.

William Wood, in the New England Prospect, speaks extendedly of the early gardens and the numerous useful plants native to the country, mentioning what he saw at Ipswich, Salem, Marblehead, etc.; Parkinson and Jerard

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\* The writer is indebted to Dr. Henry Wheatland for his assistance in obtaining notices of the early botanists of the county, chiefly from the Proceedings and Historical Collections of the Essex Institute, from which a large portion of this sketch is made.

enumerate New England plants; John Josselyn, previously referred to, gives an account of the native and introduced species; and other early writers, including John Winthrop, speak of the excellent quality of the native fruits and the beauty of the flowers, particularly dwelling on the superiority and abundance of the wild strawberries.

None of these can, however, be spoken of or claimed as Essex County botanists, and it is not until after the close of the American Revolution that we find any serious or scientific study of the plants of the county.

Dr. Manasseh Cutler was born at Killingly, Connecticut, May 3, 1742, graduated at Yale College in 1765, afterward studied law, and was admitted to the bar in 1767. He soon studied for the ministry and was settled at the Hamlet Parish in Ipswich, which was set apart from that town and named Hamilton for Alexander Hamilton whom Dr. Cutler greatly admired. He served as a chaplain during the war of the revolution and on his return studied medicine which he afterwards practised among his parishioners. The efforts of Dr. Cutler secured the passage, in 1787, of the famous ordinance by which freedom was declared in the northwestern territories and he soon after organized the first band of pioneers that emigrated from the east to Ohio. The next year he followed them driving himself the entire distance in a sulky, being accompanied by a few friends. Upon his return from the west, or in 1800, he was chosen to represent old Essex in Congress where he served two terms. While in Philadelphia in 1787, he visited at the house of Benjamin Franklin, and afterward wrote an account of the great statesman which was considered as one of the best, being copied by Sparks in his life of Franklin. Dr. Cutler prepared, in 1783, "An account of some of the vegetable

productions, naturally growing in this part of America, botanically arranged," which was published in the first volume of the *Memoirs of the American Academy of Arts and Sciences* in 1785. He here described some three hundred and fifty species of flowering plants suggesting several points which have been followed by later botanists. It was Dr. Cutler's intention to extend this work, and there are in existence several manuscript volumes which he prepared toward this end. These valuable manuscripts are in the possession of Prof. Edward Tuckerman, who intends that their final destination shall be the library of Harvard; and it is to be hoped that they may at some future day be printed, with such notes as would be required to make them of use to the present generation of botanical students. Dr. Cutler's death occurred in 1823, after more than fifty years' service in one parish. He has been called the father of American botany, a term certainly appropriate for the times and for this region, where his mantle fell on the shoulders of Osgood, Nichols, Oakes, and Pickering.

Dr. George Osgood, son of George and Elizabeth (Otis) Osgood, was born at Fair Haven, March 25, 1784. He studied medicine with his father and settled in Danvers in 1804, where he had for many years an extensive practice. Dr. Osgood acquired, by his association with Cutler, Nichols and Oakes, a taste for and knowledge of botany which lasted him through life. He contributed to Dr. Bigelow much valuable information while the latter was preparing his "*Florula Bostoniensis*," and in 1853 published in the *Salem Observer* a local list of flowering plants. He died May 26, 1863.

Dr. Andrew Nichols was born in the rural part of Danvers, Nov. 22, 1785. He was the son of Andrew and Eunice (Nichols) Nichols, and studied medicine under



Dr. Waterhouse, settling in that part of Danvers, now Peabody, in 1808, where he practised successfully, remaining there until his death, March 31, 1853.

He was particularly interested in the local natural history of this region, and in 1816 delivered a series of lectures on botany, the first of such in this part of the country. Dr. Nichols was one of the founders of the Essex County Natural History Society and its president, retaining unabated till death his interest in his favorite study.

William Oakes must be acknowledged as the most eminent botanist of Essex County birth. He was the son of Caleb Oakes and was born at Danvers, July 1, 1799. He was educated at Harvard receiving the degree of A. B. in 1820. He early developed a taste for natural history relinquishing the practice of law, his chosen profession, to study this branch of science.

Mr. Oakes' work was chiefly in New England, collecting extensively in Essex County, Mass., Vermont, the White Mountain region, and southeastern and western Massachusetts. He prepared the list of plants of Vermont for Thompson's history of that state; and his work at the White Mountains was so thorough that recent collectors, with all the advantages of improved roads and easy access to every portion of that region, have failed to add but few to the number of species which he discovered there. It was his intention to have published a flora of New England, but was deterred by the appearance of Beck's Botany. He afterwards became deeply interested in a work, with illustrations by Sprague, upon White Mountain scenery, which was published in 1848; but not until after his death which occurred July 31, 1848, the preface of the work having been written July 26, only five days previous.

Mr. Oakes was impulsive and generous; thoroughly in

earnest in his favorite study, he seriously impaired his fortune to carry out his schemes more perfectly. Like many other men of note, he was hardly appreciated while living, but no monument which could have been erected would have made his memory more cherished or his worth more appreciated by the present generation of botanists than that which he left behind,—an extensive collection of most beautifully prepared botanical specimens, with an identification absolutely correct, besides many valuable notes and observations. Prof. Tuckerman dedicated to him a pretty little plant common in the region of Plymouth, but it afterwards had to be transferred to another genus; and now for the first time in any flora, it becomes a pleasant duty to give by its name, "Oakesia," the little bellwort, a common Essex County plant, which Prof. Watson of Cambridge has found necessary to separate from the genus to which it has heretofore been referred in his revision of the family Liliaceæ, and has feelingly dedicated to the memory of William Oakes.

Dr. Charles Pickering, son of Timothy and Lurena (Cole) Pickering and grandson of Col. Timothy Pickering of revolutionary fame, was born at Starucca Creek on the Susquehanna, Pennsylvania, in 1805. He was educated at Harvard in the class of 1823, graduating at the medical school in 1826. In 1838 he was appointed naturalist to the U. S. (Wilkes) Exploring Expedition; and to perfect his knowledge of animals and plants in foreign parts, he made very extensive journeys after his return from that expedition. He was the author of several works of great value which in their preparation required much untiring research; among them are "Geographical distribution of Animals and Plants" and "Chronological History of Plants," the latter work occupying the last sixteen years of his life in its preparation.

During his college life Dr. Pickering spent much of his time at Wenham, at the homestead of his grandfather, Col. Pickering, and here he was in the habit of botanizing in company with William Oakes, a favorite locality being the "Great Swamp." It is but right that Essex County should claim a share of the honor of his name, for it was here that his attention was drawn to botany, and in the *Chronological History of Plants*, page 1063, we find the following entry "1824 \* \* In this year, after an excursion in 1823, with William Oakes diverting my attention from entomology, my first botanical discovery." Dr. Pickering died at Boston, March 17, 1878. The writer will always remember with pleasure and gratitude the many hours spent with Dr. Pickering during 1876 and '77, while he patiently sought out, among his early manuscript notes and his letters from William Oakes, the species and stations noticed while botanizing in Essex County more than fifty years before.

Rev. John Lewis Russell, son of John and Eunice (Hunt) Russell, was born at Salem, Dec. 2, 1808. He was at Harvard in the class of 1828, and graduated at the divinity school in 1831. After occupying pulpits in Chelmsford, Hingham, Brattleboro, Kennebunk and various other places, he returned in 1853 to Salem, where he resided, preaching occasionally, until his death June 7, 1873.

Mr. Russell was particularly devoted to cryptogamic botany, publishing accounts of his investigations from time to time as he proceeded, besides many popular articles on various families of plants. He lectured frequently on botany and was for many years vice-president of the Essex Institute.

Mr. Russell contributed much to the general knowledge of botany in Essex County, but his most extensive collections were made in other places.

The only attempt at an enumeration of county plants, as such, is that of Mr. Cyrus M. Tracy, of Lynn. It was intended to give a list of the flowering plants found in that region and contained 546 species. Besides possessing a very happy gift as a botanical lecturer, Mr. Tracy has contributed several valuable articles upon local botany to the publications of the Essex Institute and elsewhere.

Mr. Geo. D. Phippen, of Salem, whose notes on the native plants have materially aided the writer, has often presented the subject of botany at meetings of the Institute, and has written several articles of interest upon the subjects which have been published in various places. Mrs. C. N. S. Horner, of Georgetown, a most excellent botanical collector, published a list of the plants of that region in the Georgetown Advocate in 1876. Mr. Calvin Pool, of Rockport, prepared a somewhat smaller list of plants of Cape Ann, which was published in "Pigeon Cove and vicinity" in 1873. Mr. S. B. Buttrick, of Salem, whose years do not diminish his interest in botany, and who is ever on the alert to find some rare flower, has contributed several lists of plants to the earlier numbers of the Proceedings and Bulletin of the Essex Institute, as also have Dr. G. A. Perkins, of Salem, chairman of the botanical section of the Peabody Academy of Science, Mr. George F. H. Markoe, formerly of Salem, now of Boston, Rev. Ariel P. Chute, formerly of Lynnfield, and many others. Dr. Henry Wheatland, although not claiming to be a botanist, has often aided those who did, by his assistance in revising their articles for the publications of the Institute while acting as the editor. Mr. S. P. Fowler, of Danvers, one of the older botanists and a companion of Oakes and Osgood, in many rambles, has made frequent observations regarding the trees and shrubs, and has cultivated extensively many



of our native plants. Of those who have contributed to swell the list of known county species of plants and who have not published any writings on the subject, it will be impossible to speak separately. They must be content to feel that they have aided the cause of botanical knowledge as they certainly have, and are deserving their share of credit for so doing. There are many who have collected and prepared specimens which will always serve as pleasant reminders of their work. Among such are Mr. B. D. Greene, who added several plants to the flora from near Tewksbury; Mr. Wm. P. Richardson and Mr. S. Bass, who botanized near Salem; and more recently Mrs. Alex. Bray, Mrs. Charles Grover, Mrs. J. Babson and Mrs. Davis, who have added many species to the list of Cape Ann Algæ; Mr. Frank Lufkin of Pigeon Cove, who has noticed many plants new to that region; Mr. John H. Sears, of Danvers, whose specialty, the forest trees, has been the means of bringing together at the Museum of the Peabody Academy of Science one of the best local collections of native woods in any museum; Mr. W. P. Conant, who has added many species of Cyperaceæ and Gramineæ and a rare Botrychium to the flora; besides many others whose names will appear in the list associated with the plant which they have been fortunate to discover.

To those whose assistance either by their writings, by specimens contributed, or who have rendered any assistance by information or other attention, the writer desires to express his warmest thanks. It would be impossible for him to specify those who have aided him or their manner of so doing, and he can only thank all collectively which he does most sincerely.

Publications in which notices of interest relating to the Botanists or the Plants of the County may be found.

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MEMOIRS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES, Vol. J.  
Boston, 1785. CUTLER'S LIST OF PLANTS.

BIGELOW'S FLORULA BOSTONIENSIS, 1st, 2nd and 3d editions.

CATALOGUE OF ANIMALS AND PLANTS OF MASSACHUSETTS in HITCHCOCK'S REPORT ON THE GEOLOGY, ETC., OF MASSACHUSETTS, 1833.

GRAY'S MANUAL, 1st, 4th and 5th editions.

GRAY'S FLORA OF NORTH AMERICA. Part I.

ESSEX INSTITUTE PROCEEDINGS, BULLETIN, AND HISTORICAL COLLECTIONS.

AMERICAN NATURALIST, BOTANICAL DEPARTMENT.

EMERSON'S TREES AND SHRUBS OF MASSACHUSETTS.

TUCKERMAN'S JOSSELYN'S NEW ENGLAND'S RARITIES DISCOVERED.

TRANSACTIONS OF AM. ANTIQ. SOCIETY, Vol. IV.

TRACY'S FLORA OF LYNN, etc.

PICKERING'S CHRONOLOGICAL HISTORY OF PLANTS.

WATSON'S REVISION OF THE LILIACEÆ IN PROC. AM. ACAD. ARTS AND SCIENCES. Vol. XIV.

WATSON'S BIBLIOGRAPHICAL INDEX TO N. A. BOTANY.

DECANDOLLE'S PRODROMUS (occasional reference to Oakes).

EATON'S FERNS OF NORTH AMERICA.

HARVEY'S NEREIS BOREALI-AMERICANA.

FARLOW'S LIST OF MARINE ALGÆ OF U. S. IN REPT. FISH COM.,  
1875, AND PROC. AM. ACAD. OF ARTS AND SCIENCES. Vol. X.

FLINT'S GRASSES AND FORAGE PLANTS.

TRANSACTIONS OF THE MASS. HORT. SOC.

HISTORY OF THE MASS. HORT. SOC.

OAKES' CATALOGUE OF VERMONT PLANTS IN THOMPSON'S HISTORY  
OF VERMONT. Pages 173-208.

HALSTED'S CHARACEÆ IN PROC. BOST. SOC. NAT. HIST. Vol. XX.

LIST OF THE PLANTS OF GEORGETOWN AND VICINITY, by Mrs.  
Horner, in GEORGETOWN ADVOCATE, 1876.

LIST OF PLANTS NEAR DANVERS, by Dr. Geo. Osgood, in SALEM  
OBSERVER, 1853.

HOVEY'S MAGAZINE OF HORTICULTURE (various articles by Oakes  
and Russell).

LIST OF PLANTS OF PIGEON COVE, by Calvin Pool, in "PIGEON COVE  
AND VICINITY."

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THESE notes are introductory to an Enumeration of the Plants of Essex County that has been prepared, after a careful examination of the work of the earlier botanists and diligent search in almost every portion of the county for species not previously noticed, and will appear in a separate issue, as an occasional publication of the Institute.

With so few persons devoting themselves to the study of botany or the collection of speci-

mens, particularly of the lower orders of plants, it would be impossible to present an absolutely complete list, and perhaps with even the greatest facilities no one has succeeded in so doing for any region.

Almost the only extended collection of dried specimens of county plants were those of the late Mr. Oakes, so that there really exists no very great foundation upon which to build, other than the herbarium recently collected, and the writings of the more reliable among the earlier botanists, who for nearly a century have now and then appeared upon the scene.

Of the plants enumerated, almost all are represented in the herbarium of the Peabody Academy of Science at Salem, and where the species has not been collected and its occurrence is only known by the testimony of some writer, it is so stated in the list.

Several errors have been detected in early local lists and corrected, and such notes added to the paper as seem of interest locally or otherwise.

The writer would express his indebtedness to Prof. Asa Gray, Prof. G. L. Goodale and Prof. Sereno Watson, for their numerous kindnesses and assistance rendered him during the past five years while preparing this flora, and also to Messrs. Edwin and Charles E. Faxon for their kindness in revising the final proofs.



FIELD MEETING AT THE WILLOWS, SALEM NECK,  
TUESDAY, JUNE 22, 1880.

THE two hundred and fiftieth anniversary of the arrival of John Winthrop, at Salem, with the charter and records of the Massachusetts Bay Company, occurring on June 22, 1880, it was deemed meet and appropriate that the first field meeting of the season should be held on that day, at the Pavilion on Salem Neck, from which is obtained an extensive view of the bay, and of the shore along which the fleet sailed ere the anchors were dropped in the waters of New England; and that the exercises of the occasion, instead of a discussion on subjects of general scientific and historical interest, should be devoted to a recital of incidents connected with this important event, or such other topics as the time and place might suggest.

A description of the appearance of Salem harbor, at this early period in our history, may be gleaned from the following extracts from the diary of Rev. Francis Higginson, who, under date of "Fryday, June 26, 1629," writes: "The sea was abundantly stored with rockweed and yellow flowers like gillyflowers. By noon we were within 3 leagues of Capan, and as we sayled along the coast we saw every hill and dale, and every island full of gay woods and high trees. The nearer we came to the shoare the more flowers in abundance, sometymes scattered abroad, sometymes joyned in sheets 9 or 10 yards long, which we supposed to be brought from the low meadows by the tyde. Now what with fine woods and greene trees by land, and their yellow flowers paynting the sea, made us all desirous to see our new paradise of New England, whence we saw such forerunning signals of fer-

tilitie afarre off."<sup>1</sup> On Monday, June 29, 1629, he writes : "we passed the curious and difficult entrance into the large and spacious harbour of Naimkecke, and as we passed along it was wonderful to behold so many islands replenished with thicke wood and high trees and many fayre green pastures."<sup>2</sup>

The appearance of this shore, so pleasantly described by Mr. Higginson, has undergone great changes since his day, and more especially during the past thirty or forty years. It is now included within the limits of Beverly, Manchester, and Gloucester, and is a much frequented and very delightful summer resort, many of the wealthiest and most prominent families of the country, including merchants, bankers, artists, professional men and persons of leisure from the great cities, making this their summer home.

The fragrant pine woods, the oaks, the birches, and the green fields come down even to the beaches, to the rocks, and to the seaweed, and mingle the freshness of the country with the ocean breezes. The elegant villas, with their quaint architecture, dot the coast, and enliven the dark green of the woods with their red roofs. Every secluded cove has its favorite yacht; the beaches are hard and smooth, and the shouts and laughter of the bathers mingle harmoniously with the rore of the surf, and the hoary cliffs of primitive rock extend into the sea, scarred, wrinkled and worn.

The belt of woods extending parallel to the coast, diversified with ponds, rivulets, rocky hills and meadows, the

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<sup>1</sup> Mr. Higginson arrived near midsummer; at this period of the year, great numbers of jelly-fishes (the *Cyanea arctica*, *Aurelia flavidula*, and other species) are observed on the surface of the water near the coast. Possibly specimens of these animals, some having the resemblance of flowers, may have attracted the notice of the voyager, and have thus been mentioned in his journal.

<sup>2</sup> See Hutchinson's Collection of Papers, pages 41 and 44.

habitat of many rare floral gems (of which may be specified the *Magnolia glauca*, a representative of a more southern flora, and the *Linnea borealis*, that of the alpine), affords many picturesque views and delightful rural by-paths and lanes, adding much to the attractions of this pleasant summer retreat.

The Pavilion is located on or near the six acres of land granted by the town of Salem, to Rev. John Higginson in 1661. This land he conveyed by deed (Reg. Deeds, Essex, vol. iii, fol. 396), 25, 9, 1670, to Thomas Savage, who on August 6, 1675, transferred the same by deed of gift to his daughter Sarah and her husband, John Higginson, jr., with lands adjoining which he had purchased of other parties, in all about twenty-eight acres (Reg. Deeds, Essex, vol. iv, fol. 383).

A grandson of John Higginson, jr., the fourth John Higginson<sup>3</sup> in succession (the four were living at the period from the birth of the youngest Jan. 10, 1697-8, to the death of the eldest in Dec. 9, 1708) conveyed this estate April 8, 1730, to Benj. Ives<sup>4</sup> (see Reg. Deeds, Essex, vol. lv, fol. 92).

<sup>3</sup> Rev. John Higginson, born at Claybrook, Aug. 6, 1616, came with his father to Salem in 1629, and in 1641 assisted Rev. Henry Whitfield (whose daughter Sarah he married) in the ministry at Guilford, Conn. He returned to Salem in 1659 and was ordained as pastor of the church, which his father had founded some thirty years before, and continued the respected minister until his death Dec. 9, 1708.

II John born at Guilford, 1646, a merchant, settled in Salem; Lient. Col. of the regiment, a member of the Governor's council, etc., died March 23, 1719.

III John born Aug. 20, 1675, educated a merchant, lived in Salem, died April 26, 1718.

IV John born Jan. 10, 1697-8, graduated at Harvard College, 1717; sustained chief offices of the town, County Register, etc.; died July 15, 1744.

For a sketch of this family see Hist. Coll. Essex Inst., vol. V, p. 33.

<sup>4</sup> Benjamin Ives was the son of Thomas and Elizabeth (Metcalf) Ives, and was baptized at the First Church, Aug. 9, 1702. He md. Anna, dau. of Roger Derby, and in 1715 bought of the family of Thomas Beadle deceased, the estate now bounded by Essex, Pleasant, and East streets. He became a prominent merchant of his time and bought much real estate in Salem. Capt. Ives died in the prime of life, in the full tide of a prosperous career, about July, 1752.

After the death of Benjamin Ives in 1752, the estate with additional purchases, including land obtained from the town by vote of the citizens, in exchange for Pignal's<sup>5</sup> or Roache's Point, on which is located the present almshouse, amounting to forty acres, and also land from Abbot,<sup>6</sup> 16 Aug., 1738 (Reg. Deeds, Essex, vol. lxxiv, fol. 176), passed into the possession of his son John Ives, who conveyed the same to Richard Derby<sup>7</sup> May 16, 1758 (see Reg. Deeds, Essex, vol. cxliv, fol. 40).

After the death of Richard Derby this property was assigned to John Derby towards his portion of his father's estate, who conveyed the same by deed to Edward Allen, Dec. 13, 1793 (see Reg. Deeds, Essex, vol. clvii, fol. 73). After the death of Edward Allen, July 27, 1803, and of his wife Margaret, Aug. 13, 1808, this estate passed into the possession of his son Edward Allen, who sold the same to Josiah Orne, Feb. 26, 1810 (see Reg. Deeds, Essex, vol., clxxxviii, fol. 177). Josiah Orne, April 6, 1816, conveyed the same to Jonathan Dustin of Danvers (see Reg. Deeds, Essex, ccx, fol. 86). Eliza Sutton, Hazen Ayer and Serena his wife, in her own right, all of Peabody, being heirs of the late Jonathan Dustin,

<sup>5</sup> This name appears in deeds, but it should be "Picton" named for Thomas Picton to whom the land was originally granted. Sometimes spelled Pigden.

<sup>6</sup> The following Deposition from the State Records probably refers to the same person:—John Abbot of Salem, Shoreman, aged seventy years, testifyeth and deposeeth that during my acquaintance of many years with Mr. Philip English of Salem who is now a Prisoner in the said Town Gaol, I have heard him the said English declare that he was bred & born in the Communion of the Church of England, and that he would go to no other publick worship willingly, & if he had opportunity to go to a Church agreeable to which when the Church was erected at Marblehead he the said English & I have gone frequently thither together from that time down to this, & further there lying a ferry between this Town & Marblehead over which the ferryman could by no means be prevailed upon to carry us every Lord's day, he, the said English, has several times spoke to me to be partner with him in a Boat that we might go thither constantly to Church.

Salem, Feb. 29: 1724-5.

<sup>7</sup> For a sketch of the Derby Family, see Hist. Coll., Essex Inst., vol. III, pp. 154, 201, 283.



conveyed the same to Daniel B. Gardner, jr., of Salem, Sept. 24, 1875 (Reg. Deeds, Essex, vol. dccccxli, fol. 233), who had the land surveyed, streets and avenues laid out, and many lots sold, upon which have been built a large number of seaside cottages.

In 1876, the streets and avenues were constructed. In 1877, the Naumkeag Street Railway Company extended its tracks from the junction of Essex and Webb streets to the Willows. Cars went over the road June 9, of that year—on the following day it was opened for the public travel. Parties interested in the railroad bought land of Mr. Gardner, June 19, 1878 (Reg. Deeds, Essex, vol. m, fol. 204), and during the following spring and early summer erected the Pavilion (the place of meeting), which was opened to the public on the 17th of June. This building contains on the lower floor a refreshment saloon, a large hall 35 by 80 feet, with anterooms attached—on the second floor, a large dining hall and kitchen, with small private dining rooms. The tower has rooms in several stories, and above the balcony, is a camera obscura, giving an extensive marine view, including the adjacent shores and the islands in the harbor. During the present season the Coliseum, a large circular building, has been erected for entertainments and public meetings,—the grounds have been enlarged by the purchase of Mr. Gardner, of additional land adjoining, March 4, 1880 (Reg. Deeds, Essex, vol. mxxxii, fol. 246), and very much improved by the planting of shrubbery, ornamental trees, and flowering plants, making paths, fountains, etc. Additional improvements are in contemplation the coming season.

This portion of the neck has been known in the past as "The Higginson Farm," "The Allen Farm," and more recently "The Juniper." Some years since, there was a

large group of juniper trees, but for several years they have been gradually decaying—a few yet linger among the cottages, so few that one would hardly conjecture that this place derived its name from their presence. Hospital Point and the land adjoining on the northern boundary of the above, owned by the city, was set apart by an order of the city council, adopted May 9, 1859, "to be kept open and dedicated as a Public Square for the use of the inhabitants of Salem forever, under such regulations as the council shall from time to time establish." This place has been known as "The Willows," from a double row of willows planted about the beginning of the present century, under the direction of Capt. Israel Williams.

On the 8th of July, 1878, an ordinance was passed by the council, and approved by the mayor on the day following, for "Ball Playing," assigning for this purpose a piece of land enclosed as a part of the "Poor Farm," lying west of "The Willows" so called, and running west and including the rising ground to the western line of the fort. On this land trees of various kinds have been set out, and these grounds will probably be opened to the public at no distant day.

During the forenoon, an opportunity was afforded, to those interested in our early history, of visiting the various places of interest, and of recalling some of the old landmarks that are now rapidly disappearing under the hands of modern improvement. On Winter Island and other places near by, buildings were erected, wharves constructed, and vessels built for the purpose of carrying on the fisheries which flourished from an early period to 1735, when it was entirely discontinued in this locality, and now scarcely a vestige of this former occupancy and industry remains.

Previous to 1714, Winter Island was owned by the

commoners (except a narrow strip on the northeastern end which was attached to the Higginson farm), and was leased to various individuals—after the vote of 1714, it came into possession of the town and was used as a pasture with the neck, after the discontinuance of the fisheries until 1824, when it was transferred to the Poor Farm. In 1863, it was ceded to the United States government for coast defences.

In 1870, the Secretary of War permitted the Trustees of the Plummer Farm School for boys to establish their institution there, and the city conveyed to the same parties whatever interest it might have in the premises.

This institution was founded by Miss Caroline Plummer of Salem, who died May 15, 1854, and is intended for the instruction, employment, and reformation of juvenile offenders in the city of Salem. The residue of her estate, after the payment of other bequests and debts, was appropriated to this purpose. Sum received, \$25,462.23; the Trustees are appointed by the mayor and aldermen, and are incorporated by an act of the legislature, passed May 21, 1855. First meeting of the Trustees was held Nov. 26, 1855, when by-laws were adopted and officers elected. The present building was finished for occupancy May 20, 1870. The city government appropriated \$8,000 for this object. Charles A. Johnson was appointed the superintendent, and now holds the office. First boy was admitted Sept. 1, 1870—the present number is thirty. The present amount of invested funds is \$50,000.

The traditional site of Clifford's tavern was on the left of the road just after passing the causeway. The Town Records (vol. for 1659–1680, page 306) inform us that "at a meeting of the selectmen, Nov. 25, 1679, the selectmen consent unto and approve of Sergt Jno. Clifford to keepe a victualling house att Winter Island."



In 1805, the question of the town's right to sell this island was introduced at a town meeting, and a committee, consisting of Joseph Story (afterwards Justice U. S. Sup. Court) and others, was directed to report on the subject — the report was favorable and was submitted at a meeting held Aug. 12 (see Salem Gaz., Aug. 16–20, 1805), and was not accepted. Samuel Putnam (afterwards a Judge Mass. Sup. Court) expressed views in opposition, and it is intimated that Wm. Prescott entertained similar opinions.

Some fifty years afterwards the subject of selling Winter Island was again agitated and referred by the city council to the city solicitor for his opinion (see Report on the sale of the Neck Lands, communicated to the city council, Dec. 27, 1858, by W. C. Endicott, the city solicitor (now Judge Mass. Sup. Court)).

This document, in addition to the legal opinions therein expressed, contains a history of the Neck Lands, in particular, and notices of the commoners' grants, the circumstances under which they were made, the policy pursued by them at that period, and also the town's connection with these lands. It is well known that all the lands in this vicinity were originally held by the commoners, the proprietors of lands lying in common and undivided. At meetings held in 1713 and 1714, votes were passed, granting to the town, the roads, the burial places, the neck, the common, and other unappropriated lands, lying within the body of the town. Grants were also made to the poor for a pasture under the care of the selectmen, and to the ministry in the several parishes, also, that all the common lands be measured and divided among the commoners, according to the number of cottage rights each one held. Several distinct proprietaries were formed under an act of the legislature, The Great Pasture, Sheep Pasture, etc. Scarcely a vestige now exists of this old custom of holding lands in common. In this



connection, reference may be made to a Report on "The common lands of the city of Salem," prepared by Hon. C. W. Upham, during his mayoralty, and printed in the Reports for the financial year 1852.

Several forts and breastworks have from time to time been built, but only two now remain, Fort Lee on the highlands of the Neck, and Fort Pickering on Winter Island. According to tradition, Fort Lee was originally planned by Gen. Charles Lee, who gave instructions regarding its construction, and that it be designated by his name. Charles Lee was a major general in the Revolutionary army, born at Dernhall, Cheshire, England, in 1731, died at Philadelphia, 2 Oct., 1782. He accompanied Washington to Cambridge, where he took command of the army 3 July, 1775; at this time he was employed with others in arranging for the defence of the harbors along this coast.

Fort Pickering was built soon after the settlement; frequent allusions are found in our Records. In 1699, it was called Fort William, sometimes Fort Ann. Oct. 30, 1799, the name was changed by order of the war department to Fort Pickering, in honor of T. Pickering of Salem, a member of Washington's military family during the war, and of his cabinet during his presidency. It has been several times put in order, when war was pending, mounted with cannons and garrisoned with troops; on the return of peace, the guns were removed and the troops disbanded.<sup>8</sup>

Perhaps the most interesting of these earthworks, because now threatened with obliteration at no distant day, though still easily traced, is the one at the Juniper.

There seems to have been an old block house there in 1758. Barracks had been erected there, April 22, 1776,

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<sup>8</sup> See Hist. Coll. Essex Inst., vol. V.

and in 1787, Juniper's battery is named in a report of the French engineer, Rochefontaine, who was then examining the fortifications of New England. At this period, the old forts seem to have been much frequented by children from the east end of the town, who resorted there for games of props and wrestling, and on holidays found cakes and other articles of refreshment for sale there. (See Hist. Coll. Essex Inst., vol. VI, p. 85.)

Another incident of interest is preserved in the "famous records" kept at the barber's shop of Benjamin Blanchard on Essex, opposite Cambridge street; in which records, local events were entered from day to day, by the eminent patrons of that resort. An entry under date of Jan'y 17, 1809, reads as follows :

"Col. Lee, Collector of Customs, at the head of about seventy men, went to the Hospital on the Juniper, to prevent the Embargo laws from being violated. It was suspected a vessel belonging in Beverly would sail that evening." The suspected craft did not sail that evening, but escaped the Collector's vigilance a night or two after, and it was said that her Federalist owners, as a blind, claimed that she had been run away with, and advertised a reward for information which would convict any unauthorized persons of having taken possession of her. The Hospital at the Juniper was established in 1792(?) and was destroyed by fire on the 16th of October, 1846, and the playground which the boys of Salem selected a century ago is now a place of wholesome recreation for the southern half of Essex County.

The inspiration of the occasion was not wholly in the memories of the past, but bright sunlight, refreshing breezes, the lovely green of the shore and the deep blue of the bay, dotted with the white sails of many yachts, engaged in their annual regatta that morning, added

much to the enjoyment of the large number who participated in the celebration.

At 1 p. m. lunch was served in the dining hall ; at 2.30 o'clock the afternoon session was held in the hall below. The President in the chair.

The PRESIDENT introduced, in brief and appropriate words, Robert S. Rantoul, Esq., who delivered the address which is printed in the Historical Collections of the Institute, Vol. XVI, Part 3, with the other exercises of the meeting, consisting of a poem written by Miss Lucy Larcom, and read by Rev. De Witt S. Clark, of the Tabernacle Church, Salem ; remarks from Col. T. W. Higginson of Cambridge, Hon. G. Washington Warren of Boston, Hon. G. B. Loring of Salem, Hon. H. K. Oliver, mayor of the city, Seth Low, Esq., of New York City ; letters were read by Rev. E. S. Atwood of the South Church, Salem, from Hon. Chas. Levi Woodbury of Boston, John G. Whittier of Danvers, Hon. Robert Chas. Winthrop of Boston, Hon. Leverett Saltonstall of Newton, Prof. A. P. Peabody of Cambridge, and Hon. Marshall P. Wilder of Dorchester. The exercises appropriately closed with the reading by Rev. George H. Hosmer, of the East Church, Salem, of a communication, prepared by Stanley Waters, an associate member, giving a succinct account of the life of Rev. William Bentley, D.D., a former minister of that church, a distinguished antiquarian and historical scholar, and well known for his attainments in philology and general literature ; this gathering also commemorates his birth-day. He was born in Boston, June 22, 1759. The paper also contains a narration (found among Dr. Bentley's papers) of a drive of Benjamin Ward, in company with his grandfather, Miles Ward, about the town, in 1760.

*A List of the Birds of the Hudson Highlands, with  
Annotations.*

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BY EDGAR A. MEARNS.

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[Continued from page 25, Vol. XII.]

Family, **CORVIDÆ.**

**102. *Corvus frugivorus* (Bartram).** COMMON CROW. A permanent resident; breeds.

Crows are partially migratory; and whether those that breed here are permanent residents, or are replaced in winter by individuals which breed farther north, is a mooted question; the latter hypothesis seems most probable, however. There is a regular spring and fall migration, when they move in immense flocks. On the evening of December 5, 1876, I saw a flock that almost rivalled an historic flock of Wild Pigeons. The Crows were flying southward, and settling in an evergreen wood beside the Hudson. I immediately started towards the spot, and, as I neared it, they all arose. The flock that I saw alight at first was but a small fraction of the entire number that then rose into the air; there were thousands of them. Save the loud, rushing sound produced by their flight, which sounded like the roar of a large waterfall, they were nearly silent. As they circled overhead, a few caws, like words of command from chosen officers, were heard; but the rank and file uttered no sound. Soon they alighted again in a deciduous forest not far distant, only to be again alarmed at something and take to flight; but they finally settled near the same place for the night, without a caw or a wing-flap to indicate the whereabouts of that sable army of usually garrulous birds. These migratory flocks begin to appear in October, and continue until the commencement of winter. In February, flocks are seen passing northward.

There is a mountain in the Highlands, on the east side of the Hudson, where, late in summer, thousands of Crows come nightly to roost in the cedars; all come from the east, and I do not think that any of our resident Crows join their camp.

Crows are expert fishers. In winter, they watch at the fissures in the ice along shore, at low tide, and claw out whatever fishes are passing. I have known two Crows to capture upwards of twenty good-sized gold fishes (*Crassius auratus*) in less than an hour's time.



Crows usually begin to build early in April. Mating begins in March, when they are more noisy and less shy, than at other times. The eggs, as a rule, are deposited from the middle of April to the middle of May. A nest was found on April 14, 1873, containing six eggs; another on May 24, 1873, with four fresh eggs. Their complement varies from four to seven. The old birds are very assiduous in the care of their young; the latter make a great outcry while being fed; the mother may often be seen flying in circles about the nest, talking to the little ones, and modulating her voice whimsically.

Crows eat the eggs of other birds. I caught one in the act of destroying those of the Night Heron (*Nyctiardea grisea naevia*). He came silently and stealthily into the swamp, but my shot cut short his rapacious career just as he was about to indulge his gluttonous appetite at such great cost to the poor Herons, and he tumbled ingloriously into the mud.

*Dimensions.*—Average measurements of six males: length, 19·30; stretch, 37·70; wing, 12·18; tail, 7·52; culmen, 1·92; gape, 2·22; tarsus, 2·40; middle toe, 1·51; middle toe and its claw, 1·98. Average measurements of six females: length, 18·60; stretch, 36·05; wing, 11·82; tail, 7·12; culmen, 1·76; gape, 2·02; tarsus, 2·28; middle toe, 1·38; middle toe and its claw, 1·85. Measurements of largest male (No. 234, ♂ ad., October 8, 1874, Highland Falls, N. Y., E. A. M.): length, 19·75; stretch, 39·00; wing, 13·31; tail, 8·06; culmen, 1·96; gape, 2·26; tarsus, 2·40; middle toe and its claw, 1·98. Measurements of smallest female (No. 2,011, ♀ ad., March 13, 1880, Highland Falls, N. Y., E. A. M.): length, 18·10; stretch, 34·50; wing, 10·85; tail, 6·85; culmen, 1·73; gape, 1·98; tarsus, 2·27; middle toe and its claw, 1·80.

**103. *Corvus ossifragus* (Wilson).** Fish Crow. Occasional upon the Hudson River. Observed from Riverdale to Cornwall.

I recorded its capture at Highland Falls, in the Bulletin of the Nuttall Ornithological Club (Vol. III, No. 1, pp. 45-46, for January, 1878), on the 7th of May, 1877, when I shot a female specimen. I have come across but one other Fish Crow on the Hudson River. On May 1, 1880, at Cornwall, I heard a note several times repeated, which I recognized as that of the Fish Crow. Afterwards, one flew towards me and passed quite near, so that I had a distinct view of it; its note, at the same time, was unmistakable, but I had no gun with me to make assurance doubly sure.

Mr. Eugene P. Bicknell, the only other observer who has noted this Crow upon our river, writes as follows:<sup>1</sup> "As will be seen from the following remarks, there is no doubt that a pair of these birds have

<sup>1</sup> Bulletin of the Nuttall Ornithological Club, Vol. III, No. 3, p. 131, July, 1878.

been in the vicinity during the past season. I first noticed them on February 24, being attracted by their small size, and for several weeks thereafter they were often seen, their peculiarities of note and habit at once distinguishing them from the common Crow. Their favorite resort seems to be a growth of tall and partially decayed locusts bordering a fresh-water pond, and on two of these trees standing together, somewhat apart from the others, the birds were to be found almost every morning, but, owing to their shyness and the openness of the ground, I was unable to approach within gunshot. In alighting, they usually chose the very topmost branches of the trees, and when approached manifested their suspicion by a restless and excited motion of the wings, which appeared to be more pointed than in the more stoutly built *C. Americanus*. Their note was an abrupt, expressionless croak, usually delivered singly and at regular intervals. Though other Crows were often seen in the vicinity, this pair kept aloof by themselves, and several times I saw them chased by a clamorous party of their larger relatives. Latterly, they have been rarely noticed, and then always singly, thus indicating that they are breeding in the vicinity."

In 1844, De Kay first gave the Fish Crows as inhabitants of New York State, observing<sup>2</sup> that "they are occasionally seen on the shores of Long Island, but are generally confounded with the Common Crow." His statement was not, until quite recently, fully substantiated, and has been quite generally discredited by writers. Mr. Clarence H. Eagle set the matter at rest, however, by publishing (in the Bulletin of the Nuttall Ornithological Club, Vol. III, No. 1, p. 47, for January, 1878) the following notice of its capture: "On the 17th of July, 1873, I shot a fine female of this species near Rockaway, L. I. The bird was flying around, but kept apart from a flock of Common Crows in the vicinity." Mr. Theodore Roosevelt furnished the next record of its capture on Long Island (Notes on some of the Birds of Oyster Bay, L. I., March, 1879). He says: "Dec. 30, 1874, I shot a male. There was then a good deal of snow on the ground. It was by itself, although the Common Crows were assembled in great flocks." Messrs. Louis A. Zerega and H. A. Purdie (see Bulletin N. O. C., Vol. V, No. 4, pp. 205 to 208, and 240, October, 1880) have recently thrown much light upon the northern distribution of this species, and it is now established to be a regularly breeding summer resident on Staten Island, where Mr. H. A. Wheeler has observed it from March to November, and observes that during the past five years he has always found it breeding on Staten Island, but seldom finds more than half a dozen nests in a season, if as many as that.

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<sup>2</sup> New York Zoölogy, Part II, p. 135, 1844.

Mr. De L. Berier does not regard it as rare on Long Island. Mr. Zerega has found it to be a common permanent resident along the shore of Sandy Hook Bay and at Seabright, N. J., and infers that it breeds in those places.

I found a large flock of Fish Crows near Garden City, Long Island, N. Y., on October 29, 1880. There were others straggling about, but not associating with the Common Crows, which were also abundant.

*Dimensions.*—Measurements of No. 1,360, ♀ ad., May 7, 1876, Highland Falls, N. Y., E. A. M.: length, 16·00; stretch, 33·20; wing, 10·84; tail, 6·20; culmen, 1·37; gape, 1·65; tarsus, 1·85; middle toe, 1·30; its claw, ·47.

**104. *Cyanocitta cristata* (Linné).** BLUE JAY. A permanent resident; breeds. Large flocks move north in spring, and south in autumn.

*Dimensions.*—Average measurements of fourteen specimens: length, 11·74; stretch, 16·77; wing, 5·14; tail, 5·19; culmen, 1·09; gape, 1·20; bill from nostril, ·71; tarsus, 1·39; middle toe, ·79; its claw, ·36. Average of eight males: length, 11·92; stretch, 16·96; wing, 5·23; tail, 5·27; culmen, 1·08; gape, 1·19; bill from nostril, ·70; tarsus, 1·45. Average of six females: length, 11·63; stretch, 16·66; wing, 5·08; tail, 5·14; culmen, 1·09; gape, 1·21; bill from nostril, ·72; tarsus, 1·38; middle toe, ·79; its claw, ·36.

#### Family, **TYRANNIDÆ.**

**105. *Tyrannus carolinensis* (Linné).** KINGBIRD; BEE-MARTIN. A common summer resident; breeds. Arrives during the first half of May (4, 1872; 14, 1873; 11, 1874; 9, 1875; 8, 1876; 13, 1877; 1, 1878; 9, 1879; 8, 1880), and remains until September.

*Dimensions.*—Average measurements of eleven specimens: length, 8·51; stretch, 14·61; wing, 4·64; tail, 3·55; culmen, ·74; bill from nostril, ·55; gape, ·98; tarsus, ·75; middle toe, ·57; its claw, ·28.

**106. *Myiarchus crinitus* (Linné).** GREAT-CRESTED FLYCATCHER. A common migrant, and rather abundant summer resident; breeds. Arrives in May (22, 1874, 16, 1875; 13, 1876; 23, 1877; 3, 1878; 9, 1879; 8, 1880), and stays till about the end of September (24, 1873; 19, 1875).

Great-crested Flycatchers are extremely pugnacious. I once shot one that was fighting with another of its species, and seemed to be a veteran warrior, for his rectrices were reduced to a single one, while his general appearance reminded me of that of a dissipated tom-cat. My shot only wounded it, and it flew upwards in a spiral, and then slowly descended to the ground in the same manner, screaming and snapping its bill, the whole distance. When I started to secure it, it



flew directly at me, biting, snapping its bill, and uttering piercing screams.

*Dimensions.*—Average measurements of six specimens: length, 9·01; stretch, 13·49; wing, 4·14; tail, 3·75; bill from nostril, ·62; culmen, ·77; gape, 1·09; tarsus, ·84; middle toe, ·50; its claw, ·26.

**107. *Sayornis fuscus* (Gmelin).** PHOEBE-BIRD; PEWEE FLY-CATCHER. A common summer resident; breeds. Arrives early in March (17, 1871; 26, 1872; 19, 1873; 21, 1874; 29, 1875; 28, 1876 [26, de Nottbeck at Fishkill]; 26, 1877; 13, 1878; 13, 1879; 2, 1880), and remains until about the first of November (October 15, 1874; 23, 1876; 26, 1879). I have found its nest completed by April 10 (1880). In 1878, its full complement of eggs was laid April 20, and the first egg of their second brood was deposited on May 20th. A pair for several years built their nest in a shaft of an iron mine, in a dark and extremely humid situation; this nest contained no less than six eggs, on May 3, 1880.

*Dimensions.*—Average measurements of fourteen specimens: length, 6·99; stretch, 11·03; wing, 3·38; tail, 2·89; bill from nostril, ·41; culmen, ·60; gape, ·75; tarsus, ·67; middle toe and its claw, ·59; toe alone, ·40.

**108. *Contopus borealis* (Swainson).** OLIVE-SIDED FLYCATCHER. A common spring and fall migrant. Arrives late in May, and passes through before June (May 25 to 28, 1876; 25 to 29, 1877; 16 to 25, 1878; 9, 1879); seen in autumn from the 27th of August to the 18th of September (August 27 to September 18, 1875; September 5 to 15, 1876; September 1, 1879).

I first saw the Olive-sided Flycatcher in September, 1872, when I surprised several of them that were engaged in their favorite pastime of plucking each other in mid-air, amidst a din of screams and vituperations, and settled their quarrel by summarily disposing of two of the belligerents in my basket. Since then, I have found it nearly every spring and autumn, and frequently, during the latter season, in considerable numbers. In spring, when it is rather scarce, it is usually seen singly, or in pairs, perched upon a dry limb on top of some tall tree, sitting remarkably erect, with its crest raised. It is frequently very wild, and hard to shoot.

*Dimensions.*—Average measurements of five specimens: length, 7·39; stretch, 12·68; wing, 4·05; tail, 2·70; bill from nostril, ·54; gape, ·97; tarsus, ·60; middle toe, ·46; middle toe and its claw, ·70.

**109. *Contopus virens* (Linné).** WOOD PEWEE. A common summer resident; breeds. Arrives from the South about the middle of May (12, 1873; 12, 1874; 11, 1875; 19, 1876; 17, 1877; 20, 1878; 14, 1879; 13, 1880), and takes its departure late in September (21, 1874; 14, 1876; 11, 1880).



*Dimensions.*—Average measurements of eight specimens: length, 6·53; stretch, 10·61; wing, 3·34; tail, 2·62; bill from nostril, ·42; culmen, ·65; gape, ·83; tarsus, ·50; middle toe, ·32; middle toe and its claw, ·48.

**110. *Empidonax pusillus traillii* (Audubon).** TRAILL'S FLY-CATCHER. A rather uncommon spring and fall migrant, and occasional in summer; probably breeds.

This active, noisy species is usually present during the latter part of May (12 to 31, 1875; 22 to 28, 1876; 25, 1878; 13, 1880), and passes south in autumn. Messrs. Roosevelt and Minot found it summering in the Adirondacks, in Franklin County, N. Y.<sup>3</sup> Dr. Thomas M. Brewer described its eggs (Proceedings of the United States National Museum, p. 4, April 29, 1879) taken in Catskill mountains, N. Y., by Dr. James C. Merrill.

*Dimensions.*—Average measurements of three adult males: length, 6·09; stretch, 9·36; wing, 2·87; tail, 2·33; bill from nostril, ·35; gape, ·70; tarsus, ·66; middle toe and its claw, ·58; toe alone, ·42.

**111. *Empidonax minimus* (Baird).** LEAST FLYCATCHER. A very common summer resident; breeds. Reaches us from the South about the beginning of May (15, 1874; 10, 1875; 8, 1876; 7, 1877; 2, 1878; April 29, 1879; 26, 1880), and departs during the last of September and first part of October (latest observation October 8, 1874).

*Dimensions.*—Average measurements of twelve specimens: length, 5·41; stretch, 8·15; wing, 2·51; tail, 2·21; bill from nostril, ·31; gape, ·65; tarsus, ·65; middle toe and its claw, ·49; toe alone, ·32.

**112. *Empidonax flaviventris* (Baird).** YELLOW-BELLIED FLY-CATCHER. A common spring and fall migrant. Arrives early in May, and passes on before June (May 9, 1873; 31, 1875; 23 to 28, 1876; 17, 1877; 22, 1878; 14, 1879; 13, 1880). In autumn, passes south during September (latest observation September 28, 1875).

*Dimensions.*—Average measurements of seven specimens: length, 5·63; stretch, 8·70; wing, 2·65; tail, 2·16; tarsus, ·59.

#### Family, **CAPRIMULGIDÆ.**

**113. *Caprimulgus vociferus* (Wilson).** WHIPPOORWILL. A very common summer resident; breeds. Reaches us from the South about the beginning of May (April 23, 1872; May 6, 1873; 12, 1874; 10, 1875; 11, 1876; April 27, 1877; 24, 1878; May 4, 1879; April 22, 1880), and departs during September. My latest date is September 30, 1875, when I procured a female specimen. In 1878, its notes were heard during September, as late as the 23d. Its cry is not as

<sup>3</sup> The Summer Birds of the Adirondacks, in Franklin County, N. Y., No. "61," 1877.

frequently heard after the beginning of August, as during the early part of summer.

I append the following note from my journal: "May 14, 1877. This evening I approached a wall behind which a pair of Whippoorwills were crying; every minute they would fly out after insects, in small circles, immediately continuing their notes on settling again, so that scarcely any interruption was perceptible. Between each *whip-poor-will*, they uttered a cavernous *chuck* as usual, and then a low, guttural hollow *caw-ca-ca ca-ca—hic-hic-hic—ca-ca-tic*, etc. These ludicrous sounds, probably their love notes, were uttered in a low, hollow tone. I shot the male, at which the female flew close up to me, then removed a short distance, and commenced a loud *whip-poor-will* in seemingly a joyous tone; but this is probably their one way of expressing every strong emotion."

*Dimensions*.—Average measurements of seven specimens: length, 9.75; stretch, 18.60; wing, 6.08; tail, 4.65; culmen, .37; bill from nostril, .30; gape, 1.34; tarsus, .70; middle toe, .64; its claw, .24.

**114. *Chordeiles popetue* (Vieillot).** NIGHTHAWK. A rather common summer resident; breeds. Arrives towards the end of April (May 12, 1872; April 14, 1873; May 15, 1875; 18, 1877; April 27, 1878; 18, 1879; May 3, 1880), and departs late in September (October 3, 1874; September 15, 1875; 15, 1876). Large flocks pass through during migrations.

*Dimensions*.—Measurements of No. 681, ♀ ad., May 17, 1875, E. A. M.: length, 10.00; stretch, 24.00; wing, 7.88; tail, 4.80; culmen, .25; tarsus, .55.

#### Family, CYPSELIDÆ.

**115. *Chætura pelagica* (Linné).** CHIMNEY SWIFT; "CHIMNEY SWALLOW." An abundant summer resident; breeds. Arrives about the end of April (28, 1872; May 6, 1873; 8, 1874; 3, 1875; 6, 1876; April 26, 1877; 28, 1878; May 4, 1879; April 27, 1880), and departs the last of September (30, 1877; 28, 1878; 29, 1879; 18, 1880).

Chimney Swifts begin to build during the last week of May, when they may be seen breaking off the small, dry twigs with which they build their nests, while on wing. The eggs are laid early in June. During migrations they associate in large flocks, roosting in some large, high chimney. They retire just at dusk, dropping down chimney very much as Rails settle into the grass.

*Dimensions*.—Average measurements of thirteen specimens: length, 5.43; stretch, 12.46; wing, 4.94; tail, 1.90; bill from nostril, .15; gape, .59; tarsus, .49; middle toe, .29; middle toe and its claw, .45; claw alone, .22.

Family, **TROCHILIDÆ.**

**116. *Trochilus colubris*, (Linné).** RUBY-THROATED HUMMING-BIRD. A common summer resident; breeds. Arrives early in May (2, 1872; 11, 1873; 10, 1874; 11, 1875; 6, 1876; 12, 1877; 4, 1878), and departs in September (29, 1874; 20, 1876; 25, 1880).

Our Humming-bird is fond of visiting the marshes along the Hudson. The bulrush-tops are sometimes used to line its nest with; and the flowers growing there are a great attraction. It is a very fierce little creature when angered. I have seen one attack a pair of Downy Woodpeckers upon the tree which it had chosen for its nest, and drive them off, exhibiting the utmost rage. Once I saw one dart furiously at a small red balloon which a boy was flying in a field. It often alights on telegraph wires.

*Dimensions.*—Average measurements of six specimens: length, 3·74; stretch, 4·12; wing, 1·54; tail, 1·15; culmen, ·67; gape ·80; tarsus, ·18; middle toe and claw, ·24.

Family, **ALCEDINIDÆ.**

**117. *Ceryle alcyon* (Linné).** BELTED KINGFISHER. A common summer resident; breeds. Arrives in March (26, 1872; 31, 1873; 18, 1874; April 2, 1875; 11, 1876; March 26, 1878; April 9, 1879; 5, 1880), and stays till late in November (4, 1874; 30, 1878). It probably occurs on the lower part of the river in winter.

*Dimensions.*—Average measurements of fourteen specimens: length, 13·02; stretch, 22·16; wing, 6·17; tail, 3·60; bill from nostril, 1·85; gape, 2·92; tarsus, ·42; middle toe, ·59; its claw, ·38.

Family, **CUCULIDÆ.**

**118. *Coccyzus erythrophthalmus* (Wilson).** BLACK-BILLED CUCKOO. A very common summer resident; breeds plentifully. Arrives in May (13, 1874; 20, 1875; 20, 1876; 13, 1877; 4, 1878; 9, 1879; April 26, 1880), and stays through September (25, 1874; 16, 1879).

It begins nesting in May. The young are covered with curious-looking pin-feathers, which gives them an appearance like that of the wire swab used in gun-cleaning. The old bird is a close sitter, and, when obliged to leave its nest, moves off slowly upon the branches, with wings and tail outspread. Sometimes it will come quite close to the observer, and then utter for several minutes a low, mournful *coo*, *coo*, *coo*, *coo*, and then an outpouring of harsh, loud notes that quickly bring the mate to its side, all the while keeping its wings and tail ex-

panded, and crouching low upon the branch. Its ordinary notes are quite commonly heard at night as well as during the day.

*Dimensions.*—Average measurements of nine specimens: length, 11·83; stretch, 16·55; wing, 5·50; tail, 6·26; bill from nostril, ·74; gape, 1·27; tarsus, 1·02; middle toe, ·79; middle toe and its claw, 1·06.

**119. *Coccyzus americanus* (Linné).** YELLOW-BILLED CUCKOO. A summer resident; breeds; much less numerous than the Black-billed Cuckoo. Arrives early in May (14, 1876; 6, 1878; 10, 1880), and stays until late in September (23, 1874).

*Dimensions*—Average measurements of four female specimens: length, 12·20; stretch, 17·04; wing, 5·70; tail, 6·20; bill from nostril, ·76; gape, 1·31; tarsus, 1·10.

#### Family, PICIDÆ.

**120. *Picus villosus* (Linné).** HAIRY WOODPECKER. A permanent resident; sometimes abundant; breeds, but not plentifully. A nest which I found on Consook Island, in the Hudson River, on May 5, 1878, was built in a natural cavity in a small tree, about four feet from the ground, and contrary to Hairy's usual habit, it was warmly built of grass and strips of bark, whereas the eggs are commonly deposited right on the chips, without any attempt at a nest. The entrance was through a knot-hole, and neither it nor the interior had been enlarged by the birds. The nest rested on a mass of decayed black muck at the bottom of the hole.

*Dimensions.*—Average measurements of twelve specimens: length, 9·40; stretch, 15·66; wing, 4·78; tail, 3·30; culmen, 1·22; bill from nostril, 1·00; gape, 1·32; tarsus, ·84; middle toe, ·57; its claw, ·40.

**121. *Picus pubescens* (Linné).** DOWNY WOODPECKER. A permanent resident; abundant; breeds.

The Downy Woodpeckers, though always abundant, are especially so during the first warm days of spring-time, when they become almost gregarious, and are apparently on the move northward. Their full complement of eggs is usually deposited during the first two weeks of May, although I have found their eggs as late as May 30 (1876).

Downy is a very active, industrious bird, and perhaps this is the reason why he experiences no special discomfort from cold during the bleak winter season. At night he is comfortably housed in a hole, which he digs expressly for that purpose. What a knowing cove he is! Always, so far as my experience goes, he places the entrance to his burrow so as to face the sunny south. Though Downy is a wanderer like the rest of his tribe, yet, whenever he takes a journey into a far



country, his first labor is to construct a home wherein to spend the cold, dark night. I have often watched him at work, and have found that he is apt to remain for several days in the vicinity of his burrow. Let me give a chapter of Downy's history, copied from my note-book: I first saw him at half-past four o'clock, on the afternoon of February 20, 1878. At that time he had burrowed a very little way into a pear-tree — just made a beginning — at a height of about four feet from the ground. When I returned, in less than a couple of hours, he had entirely disappeared from view, except when he came to the top of his mine, and dropped the chips which resulted from his labors down below. When I visited the place by daylight, I found a smoothly-finished cavity such as is used for the purpose of nidification, and the ground covered with chips, but no Downy was in sight. Shortly after sunset I again visited the nest, and found him snugly ensconced within the cavity, with his bill warmly tucked away amongst the feathers, which latter were ruffed up so as to look like a black and white ball, with a red-napped head tucked in the middle. While sleeping, his whole frame heaved at every breath, so profound was his slumber. I summoned a friend to come and see my Woodpecker: after watching him a while, our voices awoke him, when he flew swiftly out, and lit upon a pear-tree close by, whence, after a lapse of five minutes, during which time he remained perfectly motionless, he returned to the burrow.

March 1st, I visited Downy at 5.50 o'clock A. M., and found him still sleeping soundly, although the Bluebirds were already singing, and the Crows flying in flocks overhead. I waited for one hour to find out his time of rising. At 6.50 o'clock, I heard an admonitory tapping upon the inside of the tree — a waking-up process analogous to our bathing and dressing, doubtless. A moment later, his head appeared at the entrance to his burrow, whence, after a jerky salutation to the first sunrise of spring, he hied him forth to his day's toil. At first, he lit on a pear-tree near by, tapped sleepily at the branch, ascended to the top of it, looked curiously at me, and then took a long flight over into the woods, where I soon heard his loud notes. *Downy is not an early riser!* On March 3d, I made the following note: "This evening at half-past five o'clock, I visited the Downy Woodpecker, and found him sound asleep in his hole, clinging to the side of the cavity, with head thrown over to one side and nestling amongst the feathers, showing conspicuously the crimson feathers of the nape. The feathers of the breast were deeply creased down the middle. As my warm breath reached him, his chest stopped heaving, and, with a swiftness that was astonishing as contrasted with his previous deep slumber, he threw out his neck and head, but, as I instantly retired, he did not leave the burrow, nor, probably, find out

what had awakened him. He retires to the burrow every evening at sunset, or sooner. On March 6th, I noted: "A female Bluebird was worrying and making a great disturbance about the Downy's hole, which she, apparently, had occupied during the day, but which he had again appropriated to sleep in. All of the Snowbirds in the neighborhood had assembled, and were contributing to the fracas all that they were able in the way of din; meanwhile, *Picus* looked out of the circular entrance to his house, collected and calm, but flew away at my approach to the woods and did not return till late.

*Dimensions*.—Average measurements of twenty-nine specimens: length, 6·83; stretch, 11·98; wing, 3·70; tail, 2·53; culmen, ·68; gape, ·79; tarsus, ·65; middle toe and its claw, ·60.

**122. *Sphyrapicus varius* (Linné).** YELLOW-BELLIED WOODPECKER. Resident, except during the summer months; abundant during spring and fall migrations, but rarer in winter.

This handsome Woodpecker is frequently seen in our forests and orchards. Like most of its family, it possesses a variety of notes, one of which resembles the common cry of the Blue Jay. Mr. Peter de Nottbeck informed me that he has frequently found it during autumn, eating the corn in the fields; it was while thus feeding that he usually secured his specimens. Early in October, 1880, I saw these birds migrating along the beach, at Great South Bay, Long Island, in large numbers. Sometimes they lit on the low pines, or even on the ground. They were passing westward in straggling flocks which were almost constantly in view.

*Dimensions*.—Average measurements of nineteen specimens: length, 8·56; stretch, 15·37; wing, 4·87; tail, 3·20; culmen, ·92; gape, 1·07; tarsus, ·78; middle toe and its claw, ·85.

**123. *Centurus carolinus* (Linné).** RED-BELLIED WOODPECKER. Occasionally found in summer. I recorded (in the Bulletin of the Nuttall Club, Vol. III, No. 3, p. 146, 1878) the capture of a specimen at Cornwall, on the Hudson, in September, 1870. A second specimen was shot at Cold Spring, on the Hudson, by Mr. Francis Butterfass.

**124. *Melanerpes erythrocephalus* (Linné).** RED-HEADED WOODPECKER. Occurs during spring and fall, and more rarely in winter. Not known to breed in the Highlands, but breeds commonly a little to the west of them. Occasionally, the young are quite numerous in autumn; but the species is rarely met with at other seasons.

*Dimensions*.—Average measurements of nine specimens: length, 9·75; stretch, 17·90; wing, 5·52; tail, 3·30; culmen, 1·17; gape, 1·37; tarsus, ·87; middle toe, ·72; its claw, ·39.

**125. *Colaptes auratus* (Linné).** GOLDEN-WINGED WOODPECKER. FLICKER; HIGH-HOLE. A permanent resident, but of irregular occurrence, and generally rare in winter; breeds plentifully. Arrives in

full force during March; has its first brood on wing by the middle of June; departs before December, excepting those which spend the winter north.

*Dimensions*.—Average measurements of fifteen specimens: length, 12·60; stretch, 20·75; wing, 6·25; tail, 4·63; culmen, 1·42; gape, 1·57; tarsus, 1·14; middle toe, ·87; middle toe and its claw, 1·27.

### Family, STRIGIDÆ.

**126. *Bubo virginianus* (Gmelin).** GREAT HORNED OWL; "HOOT OWL." A permanent resident; breeds. Have heard its notes at mid-day, in cloudy weather.

*Dimensions*.—Average measurements of two malespecimens: length, 21·44; stretch, 53·88; wing, 14·48; tail, 8·63; culmen, measured from frontal feathers, 1·55; from cere, 1·10; tarsus (about), 2·30; middle toe, 2·00; its claw, 1·12.

**127. *Scops asio* (Linné).** SCREECH OWL; MOTTLED OWL. A permanent resident; abundant; breeds.

On May 30, 1875, I found a Screech Owl's nest in the hollow bole of a buttonwood-tree, about fifteen feet from the ground. On thrusting my hand into the cavity, it was instantly seized by the old bird, which I drew out of the hole and flung away from me with the utmost dispatch, without reflecting that I was allowing an interesting specimen to escape; but I removed one of the younglings, and afterward captured both of the parents, which were in the gray plumage, as were their three young. Two of the young were kept all summer as pets, and were allowed perfect freedom; towards autumn they left the place, but one of them was found in the woods and brought back, but soon left us again; they were never heard of afterwards. The parent birds were shot at night. On my first nocturnal visit, both birds flew close about my ears, and uttered a curious, deep, guttural sound, like one of the notes of the Black-billed Cuckoo (*Coccyzus erythrophthalmus*); sometimes they darted with great swiftness close to my head, and snapped their bills sharply as they passed. I killed the female, and shot the male on the following night, when I was assailed in the same manner as on the previous evening.

On the following season, a pair of Golden-winged Woodpeckers (*Colaptes auratus*) took possession of the owl-tree, and held it until the spring of 1879, when I was again attacked by a pair of Screech Owls, when walking past the tree one dark night. On examination, a single young bird, and an addled egg, were found in the tree; the latter was, of course, appropriated on the spot. The old birds snapped their bills as usual, but also uttered an indescribable cry which was new to me. A few days later, I visited the nest in the day-



time, and captured the female in the hole along with the young one. After a prolonged search, the male was descried sitting in the crotch of a white-oak tree, in the midst of a clump of branchlets; his "ears" were very conspicuous, and his neck fully extended, as he attempted to obtain a better view of me. Both parents were red; but the young one was gray, like those obtained from the same tree four years previously.

The red, and gray-plumaged birds are about equally numerous. Some specimens are intermediate.

*Dimensions.*—Average measurements of nine specimens: length, 9.40; stretch, 23.61; wing, 6.40; tail, 3.09; culmen, .63; gape, .98; tarsus, 1.54; middle toe, 1.80; its claw, .48.

**128. *Asio americanus* (Stephens).** AMERICAN LONG-EARED OWL. A permanent resident; breeds. Mr. Francis Butterfass informed me that it was abundant about Cold Spring, where he often shot specimens. It breeds on Constitution Island, where I surprised a family of young ones, accompanied by their parents. It was at mid-day; the Owls sat in a group, with necks elongated, and ears erect. The sun shone bright, but, when disturbed, they flew without apparent inconvenience.

*Dimensions.*—Measurements of No. 2,021, ♂ ad. April 9, 1880, Constitution Island, Hudson River, N. Y., E. A. M.: length, 14.30; stretch, 36.00; wing, 11.00; tail, 6.00; culmen measured from frontal feathers, 1.06; bill from nostril, .54; gape, 1.20; tarsus, 1.55; middle toe, 1.11; middle toe and claw, 1.65. Measurements of No. 2,062 ♀ ad. June 23, 1880, Constitution Island, E. A. M.: length, 14.90; stretch, 37.75; wing, 11.00; tail, 6.40; culmen measured from frontal feathers, 1.15; from cere, .70; gape, 1.32; tarsus, 1.68; middle toe and claw, 1.85.

**129. *Asio accipitrinus* (Pallas).** SHORT-EARED OWL. Occasional in spring and fall.

**130. *Strix nebulosa* (Forster).** BARRED OWL. A permanent resident; breeds. Its notes may sometimes be heard during day-time.

*Dimensions.*—Measurements of No. 1,328, ♀ ad. October 23, 1876, Highland Falls, N. Y., E. A. M.: length, 19.25; stretch, 44.75; wing, 12.00; tail, 8.85.

**131. *Nyctea scandiaca* (Linné).** SNOWY OWL. Occasional in winter. One was captured in Orange County, about January 20, 1877. Has been reported from numerous points along the Hudson as far up as Fort Edward, in Washington County.

I saw this splendid Owl in the wild state on the 29th of October, 1880, near Garden City, on Long Island, N. Y. It flew from near the railroad: watching it from the car, I saw it alight on the ground amongst some sandy knolls, covered with red bunch-grass. On arriv-



ing at the nearest station, I started back, for the purpose of shooting it, but was disappointed in not finding it where it was seen from the train. It was found, however, about a mile farther east, surrounded by Crows (*Corvus americanus*), upon a sandy spot, where it looked like a patch of snow, in the midst of its black tormentors. The Crows scattered as I approached, and the Owl also flew slowly off, keeping just above the grass. It was followed by a part of the Crows, and soon lighted amongst the tussocks of grass. I crept up to within range, and shot it with No. 4 shot, and gave the hindermost of the retreating Crows the benefit of the left barrel, which was loaded with Bs. The Owl was not dead when I reached it, but made a fine display of courage when caught. Its eyes were wonderfully bright and full of fire; and it snapped its bill, and clawed fiercely; I offered it an empty shell, when reloading, which it seized and bit viciously. It uttered a squealing and also a grunting noise.

*Dimensions*.—Measurements of No. 815, ♂ ad. December 1, 1875 (shot on the south side of Long Island, N. Y., by Wm. Birch): length, 23.50; stretch, 58.31; wing, 14.75; tail, 9.38. Its stomach was distended with feathers. Measurements of No. 2,108, ♂ ad. October 29, 1880, Garden City, Long Island, E. A. M.: length, 22.85; stretch, 59.00; wing, 15.75; tail, 9.50; culmen, measured from frontal feathers, 1.53; from cere, 1.00; gape, 1.98; tarsus (about), 1.90; claw of the middle toe, 1.18. Stomach entirely empty.

#### Family, **FALCONIDÆ**.

**132. *Circus hudsonius* (Linné).** MARSH HAWK. A permanent resident; breeds. It occurs regularly in winter; particularly numerous in that of 1874-75, when numbers were observed in the bluish plumage. It breeds upon the marshes which connect Constitution, Consook and Iona islands to the main-land. One nest on Consook Marsh, which had been recently deserted by the young, was placed in the middle of the marsh; the ground around it was packed hard, and was bare of grass.

**133. *Accipiter fuscus* (Gmelin).** SHARP-SHINNED HAWK. A permanent resident; breeds.

Next to the Broad-winged, this is our most abundant Hawk. It builds upon trees, for the most part, though some nests are placed on ledges of rocks. During the spring movement, this species sometimes migrates in large flocks.

*Dimensions*.—Average measurements of three males: length, 11.45; stretch, 21.00; wing, 6.60; tail, 5.37; gape, .65; tarsus, 1.96; middle toe, 1.19. Measurements of female: length, 14.00; stretch, 25.75; wing, 7.70; tail, 6.65; tarsus, 2.11.

**134. *Accipiter cooperi* (Bonaparte).** COOPER'S HAWK. A summer resident. Probably occurs in winter. Breeds abundantly.

I found a nest May 10, 1876, and fired a charge of dust shot into it to make it certain whether the nest was occupied, or not; the parent bird flew swiftly away, and, though I waited a long time for its return, it did not come back. Visiting the nest another time, I shouted and made as much din as possible about the tree; after a while the bird arose and looked over the edge of the nest, and then resumed its place upon it; a moment later it flew swiftly away. I fired after it, and the shot took effect in its breast and head; stretching its legs away down, and raising its wings high and beating them swiftly, it moved slowly in a wide circle, very high in the air; it came around above the nest, and then dropped just at my feet. Although not very severely injured, it made no display of courage. The nest, built in the quadruple fork of a chestnut-tree at a height of about forty feet, was composed of sticks, all of which were of small size; there was not a feather in it, and no pretence of a lining, save a few pieces of white-oak bark; its depression was slight. The eggs, four in number, were quite fresh: white, with a strong greenish tinge, with a few brown blotches on two of them.

A nest found May 2, 1878, was built in a basswood-tree (*Tilia americana*), beside a swampy pool in the midst of a wood. When approached, the female left her nest, and alighted on the opposite side of the morass; she was joined by her mate, and both set up a singular barking cry, repeated in rapid succession, and resembling, as much as anything, the prolonged utterance of the Flicker (*Colaptes auratus*). Then the male approached, and, circling overhead, lit on a tree near the nest, but soon retreated to the opposite side of the pool; both birds continuing their singular cry. The male bird was shot as he soared overhead, and his mate withdrew, and did not return that day. The nest was somewhat bulky, and contained four eggs. It was rather more concave than usual; built of small sticks, lined with a few pieces of rough bark, with no additional materials. The eggs differed from those previously described only in having no spots, which latter are unusual.

One nest contained only three eggs.

*Dimensions.* — Measurements of No. 1,226, ♀ ad., May 10, 1876, Highland Falls, N. Y., E. A. M.: length, 19.75; stretch, 35.00; wing, 10.13; tail, 8.75.

**135. *Astur atricapillus* (Wilson).** AMERICAN GOSHAWK. A winter resident, and spring and fall migrant. Seen in spring as late as April 28 (1877).

The Goshawk is rather frequently met with; but, owing to its shyness, is rarely killed. I obtained a single specimen from the Catskill

mountains; and Mr. Wm. Church Osborn procured one at Garrisons, on the Hudson. Miss Anna B. Warner obtained a fine adult male on Constitution Island, on December 27, 1880. The gunners occasionally kill one. It likes to stay about the river marshes in winter.

*Dimensions.*—Measurements of No. 2,005, ♀ juv. December 2, 1879, Catskill mountains, N. Y., E. A. M.: length, 23·75; stretch, 44·25; wing, 13·10; tail, 11·00; culmen, ·90; gape, 1·40; tarsus, 2·88; middle toe, 1·81; its claw, ·77. Measurements of No. 2,170, ♂ ad., December 27, 1880, Constitution Island, Hudson River, N. Y., E. A. M.: length, 21·50; stretch, 41·50; wing, 12·50; tail, 9·50; tail, 9·50; culmen, measured from frontal feathers, 1·12; from cere, ·83; cere, ·40; gape, 1·25; tarsus, 2·88; middle toe and claw, 2·23; middle toe alone, 1·75; its claw, ·67; hallux, ·97; its claw, 1·08; inner toe, 1·00; its claw, 1·00; outer toe, 1·12; its claw, 53. Iris, bright carmine.

**136. *Falco peregrinus nævius* (Gmelin).** DUCK HAWK; AMERICAN PEREGRINE FALCON. A permanent resident; breeds.

I saw a fine mounted specimen in the possession of Mr. Daniel Ward, of Cornwall, which was shot while sitting upon a willow-tree in front of his residence, beside the Hudson. I have seen it frequently, but, chiefly through lack of skill in the use of the gun, have killed no specimens in the Highlands, though I procured one on the beach opposite Sayville, on Great South Bay, Long Island, on the 6th of October, 1880. There were several Duck Hawks on the beach, preying on small birds. The specimen shot had been feeding upon various passerine birds, which had first been roughly picked, and swallowed in large pieces. Whole legs of the Robin, Alice's Thrush, Catbird, and Warblers were found in its crop.

Upon the cliffs between West Point and Cornwall, the young are sometimes seen or heard; but the nest has not been found, and would probably prove to be inaccessible should it be discovered.

*Dimensions.*—Measurements of No. 2,100, ♀ juv. October 6, 1880, Sayville, Long Island, N. Y., E. A. M.: length, 19·40; stretch, 45·50; wing, 14·00; tail, 8·25; culmen from frontal feathers, 1·09; from cere, ·85; cere alone, ·30; bill from nostril, ·81; gape, 1·85; tarsus, 2·23; middle toe and claw, 2·78; toe alone, 2·15; claw, ·75.

**137. *Æsalon columbarius* (Linné).** PIGEON HAWK. By no means rare in autumn, winter and spring. My only specimen taken in the Highlands was shot in the act of destroying a hen.

*Dimensions.*—Measurements of No. 2,085, ♀ juv. September 16, 1880, Highland Falls, N. Y., E. A. M.: length, 12·60; stretch, 26·40; wing, 8·25; tail, 5·75; bill, measured from frontal feathers, ·72; from cere, ·59; from nostril, ·54; gape, ·85; tarsus, 1·57; middle toe, 1·45; middle toe and its claw, 1·80; claw alone, ·48.

**138. *Tinnunculus sparverius* (Linné).** SPARROW HAWK. A



rare resident species. Never abundant except occasionally during migrations.

On February 18, 1879, Dr. Clinton L. Baggs saw a Sparrow Hawk at the foot of 110th street, at the East River in New York City, where it seemed to be chasing the House Sparrows (*Passer domesticus*). It appeared to be in nowise frightened at the numerous workmen about the docks, and flew about amongst them, and out over the river, frequently perching on some iron pillars on shore.

*Dimensions*.—Measurements of No. 1,355, ♂ ad. April 25, 1877, Highland Falls, N. Y., E. A. M.: length, 10.42; stretch, 22.38; wing, 7.37; tail, 4.85; culmen, measured from cere, .45; gape, .70; tarsus, 1.40; middle toe and claw, 1.21.

**139. *Buteo borealis* (Gmelin).** RED-TAILED HAWK. A permanent resident; abundant; breeds.

This handsome Buzzard feeds on mice, moles and shrews, which it finds in meadows. Though it likes to sit on a hay-pole and swoop down upon such small fry, it is often quite formidable, carrying off fowls from the barn-yards. It is able to capture even the Ruffed Grouse (*Bonasa umbellus*). I once saw a Red-tail fly a quarter of a mile, bearing a full grown Ruffed Grouse in its claws. I followed, and fired a shot at it, which caused it to let its prey drop to the ground from the tree where it was feeding; it afterwards appeared to regret leaving the Grouse, which was quite neatly picked, and had one side of the breast partly eaten.

Mice, shrews and moles are especially abundant upon the salt marshes which join numerous so-called islands in the Hudson River to the main-land. Upon the edges of these marshes and on the hay-poles, our three Buzzard Hawks (*Buteo borealis*, *B. lineatus* and *B. pennsylvanicus*) are ever present during the hard times in winter, hungry and shy, and ever ready to pounce upon the first unlucky quadruped that makes its appearance on the scene. It is pleasant to see them swoop upwards from the ground and alight upon a haystack, closing their wings instantly as their strong claws grasp the top of the pole, and striking at once a perfect balance, without a wing-stroke or a sudden movement.

*Dimensions*.—Measurements of adult female: length, 21.90; stretch, 51.00; wing, 14.75; tail, 9.00; culmen, 1.07; cere, .54; gape, 1.80; tarsus, 3.34; middle toe, 1.60; its claw, .88.

**140. *Buteo lineatus* (Gmelin).** RED-SHOULDERED HAWK. A permanent resident; abundant; breeds.

**141. *Buteo pennsylvanicus* (Wilson).** BROAD-WINGED HAWK. Our most abundant Hawk. A permanent resident, but only occasional in winter; breeds.

Migrants begin coming early in March, and, ere long, large flocks



appear, flying swiftly overhead, or soaring circularly. On wing, it gives several screams uttered in rapid succession, followed by a squealing note. It feeds on small quadrupeds, and salamanders. None of the numerous specimens dissected contained feathers, or other evidence of its feeding on birds.

In the spring of 1871, a nest was built in the wood adjoining my house, from which I took one of the young birds; it became a very interesting pet, quite gentle, and fond of me, but refusing to submit to being handled by any one else; but it was prone to wander abroad, and so was lost.

On May 8, 1872, I shot a male Broad-winged Hawk upon its nest, wounding it badly. It clawed me severely when I attempted to capture it. The nest was simply a repaired Crow's nest, from which I had taken a suite of eggs the year previously. The eggs, as in every nest that I have seen, were two in number. I shot the female several days later, and found it to be in immature plumage, although mated with an old bird. During the same season, another pair built a nest in the same wood, but both birds were shot before the eggs were laid. This nest became the home of still another pair of Broad-wings on the following season. They laid only two eggs, which were remarkable for being almost unspotted. When I climbed to the nest, the male bird flew to a branch over it, uttering loud, squealing cries, and thence darted swiftly past me, in uncomfortably close proximity to my head, so that I could feel the rush of air when he passed; then, perching above me again, he would lower his head, partly spread his wings, and incline his body downwards, uttering a whining whistle as he prepared to make another swoop. He looked very formidable. I heartily wished myself at the bottom of the tree. Only when I had reached the nest did the female leave it; then she merely withdrew to an adjoining limb, and replaced herself upon the nest as soon as I began to descend. Then the anxiety of the male (greatly to my delight) appeared to be much lessened. I left the eggs, hoping that more would be deposited, but in this I was disappointed. Several days later, I took the eggs, and found embryos considerably developed.

This Hawk commonly selects a deserted Crow's nest to build upon; but I have known them, several times, to build a new nest. I have twice found immature birds breeding, in which the stripes covered the belly.

*Dimensions.*—Average measurements of two *adult males*: length, 15·85; stretch, 35·85; wing, 10·58; tail, 6·65; culmen, measured from cere, ·74; cere, ·48; tarsus, 2·50; middle toe, 1·33; middle toe and claw, 1·84; claw alone, ·65. Average of three *adult females*: length, 17·08; stretch, 37·65; wing, 11·75; tail, 7·03; culmen, measured from

cere, .77; cere, .50; tarsus, 2.75; middle toe and claw, 1.90; claw alone, .64. Average of two *young males*: length, 15.93; stretch, 35.62; wing, 10.78; tail, 6.85; culmen measured from cere, .68; cere, .45; gape, 1.20; tarsus, 2.35; middle toe and claw, 1.70; toe alone, 1.18; claw, .58. Average of two *young females*: length, 16.45; stretch, 36.69; wing, 11.08; tail, 7.15; culmen measured from frontal feathers, 1.12; from cere, .77; bill from nostril, .72; gape, 1.27; tarsus, 2.43; middle toe and claw, 1.83; middle toe, 1.33.

**142. *Archibuteo lagopus sancti-johannis* (Gmelin).** AMERICAN ROUGH-LEGGED HAWK. Occurs rarely during migrations. I have also found it at Fort Miller, on the Hudson, in November, 1876.

**143. *Pandion haliaëtus carolinensis* (Gmelin).** AMERICAN OSPREY; FISH HAWK. A common spring and fall migrant; occasional during summer. Its nest was found upon the cliffs north of West Point, many years ago. A few years since, Mr. Harold Herrick found a nest near Yonkers, on the Hudson, which contained eggs.

*Dimensions.*—Average measurements of four specimens: length, 23.10; stretch, 64.00; wing, 18.25; tail, 8.40.

**144. *Aquila chrysaëtus canadensis* (Linné).** AMERICAN GOLDEN EAGLE. Occasionally observed during spring, autumn and winter. It was formerly known to nest upon the cliffs on the west side of the Hudson, north of West Point; and it is not impossible that it still does so. Two Golden Eagles have been shot in the Highlands during the past few years. I have seen it on several occasions, but never in summer. In March, 1876, two of these Eagles were found in a certain spot in Putnam County for several weeks, but I did not succeed in shooting them. In April, 1872, I saw one twice, whose tail was all white, save a narrow terminal bar of black.

**145. *Haliaëtus leucocephalus* (Linné).** WHITE-HEADED EAGLE. A permanent resident; breeds.

The White-headed or Bald Eagle constitutes a marked and romantic feature of the superb scenery of this part of the Hudson, lending another charm to a scene already grand and impressive, but rendered sublime and awe-inspiring by the presence of this noble bird, seen perched upon some blasted tree above the massive cliffs, or soaring in higher atmospheric regions, far above reach of the coming tempest, while its shrill scream falls faintly upon the ear, answering the loud, quavering cry of its nearer mate.

In winter, when the river is frozen, the Eagles are seen soaring above the mountains, searching for the scanty prey upon which they are obliged to subsist when fish, their favorite food, is unattainable; but later, when the ice is in motion in the Hudson, carried swiftly by the current, numbers of them may be seen sitting in pairs upon trees low down by the river's edge, watching for their funny prey, or else

floating upon the ice in the stream, in company with Crows and Gulls. In summer, their favorite perch is upon some withered tree on the mountain's side, from which, at intervals, they descend to the river, or some secluded lake, to seek their food. When the ice first breaks up in the Hudson, the Eagles are sometimes extremely abundant. At that season I have counted more than twenty-five that were in view at once.

*Dimensions.* — Average measurements of two *adult males*: length, 32·85; stretch, 84·10; wing, 22·00; tail, 11·90; bill from frontal feathers, 2·48; cere, ·74; gape, 2·77; tarsus, 3·50; middle toe, 2·72; its claw, 1·37; inner toe, 1·66; its claw, 1·62; outer toe, 1·86; its claw, 1·17; hallux, 1·53; its claw, 1·69. Weight, 10 lbs., 4 oz., avoird. Average measurements of two *adult females*: length, 35·50; stretch, 89·00; wing, 24·00; tail, 12·25. Weight, 12 lbs., avoird.

#### Family, COLUMBIDÆ.

**146. *Ectopistes migratoria* (Linné).** PASSENGER PIGEON. A permanent resident. A few breed; and a few occur in winter.

*Dimensions.* — Average measurements of five *adult males*: length, 16·67; stretch, 24·30; wing, 7·88; tail, 7·80; culmen, ·72; gape, 1·12; tarsus, 1·14; middle toe, 1·16; its claw, ·37; middle toe and claw, 1·50. Average measurements of five *adult females*: length, 15·92; stretch, 23·96; wing, 7·76; tail, 7·27; culmen, ·70; gape, 1·06; tarsus, 1·07; middle toe, 1·09; its claw, ·35.

**147. *Zenædura carolinensis* (Linné).** MOURNING DOVE; CAROLINA DOVE. A permanent resident; breeds. Only occasional in winter.

*Dimensions.* — Average measurements of five specimens: length, 11·85; stretch, 17·90; wing, 5·72; tail, 5·50; culmen, ·53; bill from nostril, ·36; gape, ·76; tarsus, ·86; middle toe, ·80; its claw, ·24; middle toe and claw, 1·00.

#### Family, TETRAONIDÆ.

**148. *Bonasa umbellus* (Linné).** RUFFED GROUSE; PHEASANT; PARTRIDGE. An abundant resident species; breeds.

#### Family, PERDIDIDÆ.

**149. *Ortyx virginiana* (Linné).** AMERICAN QUAIL; BOB-WHITE. A permanent resident; breeds.

# BULLETIN

OF THE

## ESSEX INSTITUTE.

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REGULAR MEETING, MONDAY, JULY 5, 1880.

ADJOURNED to Thursday, July 8. PRESIDENT in the chair. Records read. Correspondence and donations announced.

Rev. G. M. Harmon, of Peabody, was elected a resident member.

Adj.



REGULAR MEETING, MONDAY, JULY 19, 1880.

MEETING this day at 7.30 P. M. The PRESIDENT in the chair. Records read. Correspondence and donations announced.

B. O. Pierce, of Beverly, and Ira J. Potter, of Ipswich, were elected resident members.

Adj.



## FIELD MEETING AT BRADFORD, FRIDAY, JULY 30, 1880.

By the polite invitation of Dr. George Cogswell of Bradford, an associate member of the Institute, a meeting was held at the Riverside Farm, in that town, this day. The weather was remarkably fine, and the attendance large. The Farmers' and Mechanics' Institute of Haverhill and Bradford joined in the exercises of this interesting occasion. The members and their friends from Salem and vicinity left the Eastern railroad station at 8.15 A. M., in a special train for Danvers, thence by the Boston & Maine railroad to Bradford, arriving at 9.30 A. M. Barges and other vehicles were in readiness to take the party, some two or three miles above the village, to the grounds of Dr. Cogswell, which are situated very attractively upon a bend in the Merrimac river, and consists of several hundred acres. From the house is an extensive view of the river with its interesting traditions and lovely scenery. The city of Haverhill being built upon a gentle acclivity, the houses and other buildings being interspersed with trees, gives an additional charm to the prospect. A short drive beyond the house brought the party to a large grove, where the tables for the lunch were placed, and which was the headquarters for the forenoon.

As the dinner hour approached, the ramblers who had wandered hither and thither, about the woods and on the banks of the river in search of specimens, returned, and lively groups gathered around the tables.

## THE BRADFORD ACADEMY

is the venerable, highly esteemed, and cherished institution of this town, and has its origin and outgrowth in the deep interest among the parents in mental and

moral culture, and a desire that female education especially should be advanced; the privileges, that the children to-day enjoy, did not then exist. Incorporated in 1803, a building was erected, and the preceptor elected was *Rev. Samuel Walker*, a native of Haverhill, a graduate of Dart. Coll., 1802, and the minister of the South Church, Danvers, now Peabody, from 1805 to his death, July 6, 1826. *Rev. James Flint*, who was the pastor of the East Church, Salem, from 1820 to his death, March 4, 1855, was the third principal.

*Benjamin Greenleaf* was the fourth principal, from Dec. 12, 1814 to April 6, 1836. During this period, it obtained a wide and most honorable reputation. In 1828, the school was divided into a male and female department, Mr. Greenleaf had charge of the former, and Miss Abigail C. Hasseltine of the latter.

In 1836, Mr. Greenleaf retired. The male department was then closed, and the Institution was devoted entirely to the education of females. Mr. Greenleaf then took charge of the Bradford Teachers' Seminary, and continued at its head till its discontinuance in 1848, when his professional labors as a teacher closed. As an author, he was very widely, eminently, and honorably known; while the number of his pupils went up into the thousands, the number of copies of his text-books went up into the millions; he died Oct. 29, 1864.

*Miss Abigail Carleton Hasseltine*, born in Bradford, March 15, 1788, a graduate of the school, appointed assistant teacher in the summer of 1815, principal of the female department in 1828, retired in the autumn of 1852, died January 13, 1868,—the beloved teacher and friend, and whose name is cherished in thousands of homes to-day,—contributed largely to the success of the Institution.

This Academy has done much in sending out an educated influence in domestic and social life, in ways that cannot be tangibly measured. It was in this school that Ann Hasseltine and Harriet Atwood were educated. *The first* was the youngest sister of the principal above named; she was brilliant and gifted, and married Rev. Adoniram Judson, who was ordained at the Tabernacle Church in Salem in 1812, and sailed with his wife immediately afterwards to Calcutta. She was a remarkable woman, passed through many trials and exciting experiences, and wrote a history of the Burmah mission; she died at Burmah, Oct. 24, 1826. *The second* married Rev. Samuel Newell, who was ordained as a missionary at the same time with Rev. Mr. Judson, and went to Ceylon. She died 30 Nov., 1812.

Honorable mention might be made of other teachers and other graduates, who have done good service in the work which they have respectively undertaken.

The present building, in the midst of ample grounds beautifully laid out, is in striking contrast with the humble wooden edifice, first erected for this now flourishing institution. It measures 216 feet front line, 127 feet from front to rear; four stories above the basement; built of brick with underpinnings and facings of granite. The entire building is heated by steam, lighted by gas, and has all the modern appointments. On Thursday, June 16, 1870, a very pleasant meeting was held in Bradford, the afternoon session being in the hall of this building, then recently erected and opened for the reception of pupils.

#### HANNAH DUSTON MONUMENT IN HAVERHILL.

During the day, several of the party visited the Haverhill Public Library, and the monument erected in

Haverhill to the memory of Hannah Duston, who in 1697 was seized and carried away by the Indians, and who then performed the wonderful exploit of putting her captors to death, for which act the General Court made substantial acknowledgment of her bravery.

This beautiful monument was erected upon the spot set apart as a public park, by the people in the early history of the town, and was unveiled with suitable ceremonies on Tuesday, Nov. 25, 1879, and presented to the city by Hon. E. J. M. Hale.

The pedestal is of granite and the statue is of bronze, 6 feet high, and the entire height is 15 feet. The bronze reliefs are each 2 feet 3 inches by 1 foot 6 inches, and represent: *First*, her capture; *second*, escape of her children; *third*, slaying of her captors and her escape; and *fourth*, her return. The ideal statue was designed by Mr. C. Weeks of Haverhill, and the casting was made at Chicopee, Mass.; the base was cut by Mr. Weeks, who put the whole structure in position.

Haverhill for seventy years was a frontier town, and its early history tells of many cases of savage cruelty perpetrated by the Indians upon its first settlers. The name of Hannah Duston will ever stand prominent in the annals of the town.

#### HAVERHILL PUBLIC LIBRARY.

Hon. E. J. M. Hale (the gentleman who gave to the city the Hannah Duston monument, previously mentioned), desirous of having a Public Library in his native city, submitted January 29, 1873, a proposition to the city government of Haverhill.

That His Honor, the Mayor, appoint six persons as Trustees for life, and the vacancies to be filled by the remaining Trustees, to receive all funds and administer



the same for the purposes of the proposed library. That within six months to give a certain specified lot of land to the Trustees, and \$30,000 on condition that a further sum of \$30,000 be raised and paid to the said Trustees for the uses and purposes aforesaid, and that the city government in accepting these funds shall assume and bear the current expenses of library, grounds, and appurtenances, after the building shall have been completed and furnished. The city chose six Trustees, Aug. 1, 1873, and accepted the proposals Nov. 17, 1873. The building was accepted and occupied in May, 1875, dedicated Nov. 11, 1875, and opened for public use the following week.

The building is 72 feet front on Summer street and extends back 55 feet. Height of different stories as follows: Basement, 12 feet; *first* story, 16 feet; *second*, 20 feet. Cost of building and furnishing \$49,543.32; books purchased \$16,528; making the total cost, including binding, moving, etc., \$67,711.78; to this is to be added the valuation of the land \$12,000, making the value of the whole property \$79,711.78.

The whole number of volumes in the library January 1, 1880, was 29,235; additions, during the year 1879, 2,411. *Trustees*, E. J. M. Hale, James H. Carlton, James E. Gale, R. Stuart Chase, John L. Hobson, John Crowell. *Librarian*, Edward Capen.

#### AFTERNOON SESSION.

The afternoon session was held on the floor of the large barn extemporized for the occasion into a lecture room; as the large doors swung open, row after row of settees appeared in the foreground, and beyond, in the rear of the speaker's table, framed in the open doorway a beautiful piece of landscape. The fragrant hay mow was

speedily transformed into a balcony where young and old gathered to listen. The meeting was called to order at 2.30 P. M. The President in the chair, records of the preceding meeting were read by the Secretary. The PRESIDENT congratulated the Institute, that, under such favorable auspices, another field day is held in this good old town and with so large an attendance. He then briefly alluded to the previous meetings held in this and the adjoining town of Groveland, which was known as the East Parish of Bradford, when the first meeting was held in that place. He spoke of the early explorations of the Merrimac river, particularly the one under the direction of Simon Willard and Edward Johnson, commissioners, in 1652, John Sherman and Jonathan Ince the surveyors, to ascertain the northern boundary of the colony of the Massachusetts Bay, as stated in the charter, three miles north of the northernmost point of the Merrimac river. This was a mooted question for many years, and it was not finally adjusted until the appointment of a commissioner in 1737, who determined that the northern boundary of the Massachusetts line should be a line three miles from the mouth of the river at Newburyport, thence parallel with the river as far as the Pawtucket Falls, thence west to the New York line. In 1740, His Majesty, by the concurrence of the council, adjudged and ordered this line as the northern boundary. He then called upon Dr. George Cogswell, the host, who had generously and handsomely provided so many good and pleasant things for this meeting.

DR. COGSWELL spoke of the pleasure he experienced in welcoming the members of the two societies to his farm, and said that he was thoroughly in accord with the objects and aims of such meetings as this. He also

referred to the former men of Essex county whose influence was still felt in this community, and to the pride he felt in the scientific and educational interests of the county. He closed by introducing

REV. MR. KINGSBURY of Bradford, who continued in the same general strain, eulogizing the work and objects of the Institute and welcoming the society to Bradford.

PROF. E. S. MORSE, of Salem, followed, selecting as his theme, the *Pelopæus* (the mud wasp), now building its earthen cells and plastering them on old rafters and stone walls. He described its habits, exhibited specimens of its cells and illustrated the same with blackboard drawings; he also alluded to the barn swallows (*Hirundo horreorum*), having built their nests on the beams of the barn, and many specimens were noticed flying around. Later in the meeting, he gave some of his impressions of the Japanese as a people.

Other remarks were made by Mr. J. D. Tewksbury of Bradford, Prof. Hall of the University of Minnesota, Mr. Fish of the Salem Summer School, Mr. John W. Perkins of the Salem High School, and Mr. Emery of Lawrence.

MR. JOHN ROBINSON, of Salem, offered a vote of thanks to Dr. Cogswell and his family for the numerous courtesies and hospitality extended to the members and their friends. The meeting adjourned.

Barges and private carriages conveyed the party to the station, and thus ended a day of instruction and pleasure; and the participants will long remember the very delightful day at Riverside Farm.

FIELD MEETING AT LOWELL ISLAND, THURSDAY,  
AUGUST 12, 1880.

THE third field meeting of the season was held this day at Lowell Island, near the entrance to Marblehead harbor. The steamboat, "White Fawn," left Phillips wharf at 9 and at 11 A. M., to convey the members and their friends to the island.

As usual, the party separated upon arrival, each to choose his own method of enjoyment. Some made for the bold, rocky points; some tried "luck" at fishing; and those interested in the pursuit of natural history found in the rocks, or on the beaches, or with a dredge and line from a boat, many specimens to occupy their attention.

CATTA, afterwards Catt or Cat, and now Lowell Island, lies about four miles in a southeasterly direction from the City Hall in Salem, to which municipality it belongs, although somewhat nearer in position to Marblehead. From Gerry Island, at the mouth of Marblehead harbor, it lies due east and is about one mile distant. It is thought to have been heavily wooded before the settlement. "As we passed along," says Higginson, of the harbor, June 29, 1629, "it was wonderful to behold so many islands replenished with thicke woods and high trees." In 1738-9, "woods" are mentioned on it, and the tradition is, that it was finally denuded at the Revolution to afford British cruisers a more unbroken view into the harbor. During the operation of the Boston Port Bill and the British occupation of Boston, coasters were searched at Marblehead, and sent on with an officer on board, to Boston. Feb. 9, 1775, His Majesty's ship *Lively*, 20 guns, arrived at Marblehead harbor and anchored off the fort. May 31, she sailed for Boston, and her place was taken by the sloop-of-war



Merlin. January 7, 1776, a contemporary private journal says, "Trees on Cat Island cut down last night—supposed by the Merlin."

Its shores are for the most part steep and rocky; its average elevation of surface being perhaps twenty or twenty-five feet. It is at present without a tree or shrub, and commands an uninterrupted view towards the ocean, which is unsurpassed, as well as on the land side, the green slopes of the North Shore, Salem Neck, and Naugus Head.

The first mention we find of the island is contained in the Colonial Records for 1655.<sup>1</sup> It was then granted to Governor Endicott on his own request, May 23, and is there described as "*the iland called Catta Iland, being about a two acres, lying neere to Marble Head.*" In point of fact, it has an area of about sixteen acres of upland. Felt, following Dr. Bentley, who seems to have been in error, states the area at "about nine acres." Dr. Bentley wrote in his Description of Salem in 1800, "the extent of the soil is 2,167 links, about N. W. and S. E.; but the rocks being included, the island is above 28 chains. At the northwest end is a high beach which forms a point directly opposite Marblehead. The shore is irregular and rocky. There are springs on the S. E. end which terminates in a high, rocky head."

Gov. John Endicott,<sup>2</sup> in a will which took effect upon his death in 1665, left the island to his wife for life, and after, to his "two sons John and Zerobabel, or the longest liver of them." John died first without issue, and Zerobabel on his decease, 1684, gave the island to his five daughters.

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<sup>1</sup> See Colonial Records of Massachusetts, Vol. III, p. 389. <sup>2</sup> Gov. John Endicott died March 25, 1665. See "The Endicott Family," by C. M. Endicott, N. E. Hist. Gen. Reg., Vol. I, p. 335.

From the Endicott family it passed through Samuel, a grandson of Zerobabel, by deed March 4, 1687-8,<sup>3</sup> to Richard Reed of Marblehead, and in this family, always conspicuous in the affairs of that town, the title remained for many years. On March 25, 1732, it came into the hands of Samuel Reed,<sup>4</sup> by virtue of an indenture of partition executed by the children of the late Samuel Reed, his father, and by Ebenezer Lowell, who married a daughter, and from him, after being mortgaged Feb. 20, 1738-9,<sup>5</sup> to "the Honorable James Bowdoin of Boston, Esquire" (afterwards the successor of John Hancock as governor of the Commonwealth), as "Catt Island together with the House and Woods thereon," the property passed in equal parts, Feb. 12, 1746-7,<sup>6</sup> to "Joseph Willson, Gentleman, and John Oliver, Victualler," both of Malden, in the county of Middlesex. In this and subsequent conveyances, mention is made of the house but not of the woods, and since several of these conveyances are made to inn-holders of Malden, Charlestown and Marblehead, it is a fair presumption that the very considerable value attaching at this time to Catt Island was due to its being occupied as a place of public entertainment. September 2, 1773, the property passed in equal shares to Elbridge Gerry (afterwards Governor and Vice President), Col. Azor Orne, Captain (afterwards Gen'l) John Glover, and Jonathan Glover, Esq.,<sup>7</sup> all of

<sup>3</sup> Essex Reg. Deeds, vol. XII, fol. 166. <sup>4</sup> Essex Reg. Deeds, vol. CXV, fol. 103, also vol. LXI, fol. 136-8. <sup>5</sup> Essex Reg. Deeds, vol. LXXVIII, fol. 121. <sup>6</sup> Essex Reg. Deeds, vol. XCIII, fol. 16, and vol. XCVIII, fol. 30.

<sup>7</sup> Honored names in Marblehead. Hon. Col. Azor Orne, son of Joshua and Sarah (Gale) Orne, b. in Marblehead, July 22, 1731, d. at Boston, June 6, 1796. He was a descendant from Deacon John Orne of the 1st church in Salem, who died at an advanced age in 1684.

*Elbridge Gerry*, son of Thomas Gerry, born in Marblehead, July 14, 1744, died in Washington, Nov. 13, 1814, in the office of Vice President of U. S. A.

Marblehead, projectors of the Essex Hospital for inoculation with the small-pox. After the failure of this enterprise, the island passed by various conveyances between 1795 and 1816, to members of the Fettyplace family of Marblehead, and from them, through William Fettyplace of Salem and East Boston, who became the owner of the whole estate, to John Roundy of Marblehead,<sup>8</sup> Nov. 2, 1846, who sold, Feb. 11, 1848, to Nathaniel R. Blaney of Marblehead,<sup>9</sup> the island "with all the buildings thereon," and he in turn to David Blaney of Marblehead,<sup>10</sup> January 30, 1849, who conveyed the property, June 11, 1851, to Stephen C. Phillips of Salem.<sup>11</sup> January 16, 1852, the title passed to the Salem Steamboat Company,<sup>12</sup> a corporation created by act of May 23, 1851, and authorized "to purchase, build, charter, or otherwise hold and employ, a steamboat to be employed in and about the harbor of Salem." The Essex Railroad was incorporated March 7, 1846, and opened to Phillips' (formerly Crowninshield's) wharf, July 2, 1849. A commodious hotel was erected on the island, now first called Lowell Island, which was opened to the public, June 21, 1852, and the passenger steamer "Argo," plied between the island and Phillips' wharf. July 10, 1857, the Steamboat Company sold to Gorham A. Pollard of Lowell,<sup>13</sup> who made an effort to have the island known as Pollard's Island; and, from him, through several conveyances, the property passed to the present proprietor, Samuel B. Rindge<sup>14</sup> of Cambridge.

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The Brothers Jonathan & John Glover, sons of Jonathan & Tabitha (Bacon) Glover, of Salem, removed in early life to Marblehead, & for many years held various offices of honor & trust. Jonathan was born June 13, 1731, John, Nov. 5, 1732; a Brigadier General in the army of the Revolution; died at Marblehead, 30 Jan'y, 1797. Essex Reg. Deeds, vol. CXXXII, fol. 178. <sup>8</sup> Essex Reg. Deeds, vol. CCCLXXIII, fol. 291. <sup>9</sup> Essex Reg. Deeds, vol. CCCXCIII, fol. 214. <sup>10</sup> Essex Reg. Deeds, vol. CCCCXII, fol. 245. <sup>11</sup> Essex Reg. Deeds, vol. CCCCXLVI, fol. 155. <sup>12</sup> Essex Reg. Deeds, vol. CCCCLV, fol. 206. <sup>13</sup> Essex Reg. Deeds, vol. DLV, fol. 146. <sup>14</sup> Essex Reg. Deeds, vol. DCCCXCI, fol. 131.

It would be very satisfactory, if the uncertainty hanging about the name of this island, in common with others near it, could be removed. When it was first called Cat Island none of the authorities tell us; but they assume to tell us why it was called Cat Island. The accepted explanation seems to be that "Cat" is a corruption or contraction, and that the island was in some way connected with Robert Cotta, from whom it derived its singular appellation. There is no evidence that Cotta ever owned or occupied the island, nor does he seem to have been a person of special repute or standing, such as to make it probable that the island would have belonged to him or been named for him. He was made a "freeman" May 6, 1635, and the Colonial Records spell his name "Cotty." This is the first we know of him. Ralph Fogg's Waste Book of the Quarter Courts, 1636-7, spells his name "Cotta." The terminal "a" in those days was doubtless sounded like the "a" in "fate." In John Holgrave's record of a Town Meeting, 14th, 6th mo., 1637, his name is spelled "Cottic." In Roger Conant's list of apportionments of marsh and meadow lands, made at a general Town Meeting in 1640, his name appears as "Cotty." And so Gov. Endicott spells it, 11th, 8th mo., 1640, but in his record of a meeting of the "seven men," 12th mo., 1644, Gov. Endicott calls him "Cotta." In 1645, Robert "Cotta" gets £5 allowed him for a cow out of funds provided by Mr. Andrews of London for that purpose. And the records from 1647 to 1651 show his name, in several instances, spelled "Cotta."

The first mention of the island, so far as we know, occurs in the Massachusetts Colonial Records for 1655. It was then granted to Gov. Endicott, and had never been previously granted to any other person. Gov. Endicott died in 1665, leaving it by will, after the



decease of his wife, to his two sons, or the longest liver of them; and his son Zerobabel, the survivor, died in 1684, leaving it to his own five daughters. From the middle of the seventeenth century to its close, this island remained in the Endicott family.

If we knew so much and no more, we might readily find a theory to account for the name, without having recourse to Robert Cotta. If we were obliged to derive the name "Cat" from the sound represented by "Cottie," or "Cotty," it would be more reasonable to seek its origin in some possible diminutive or term of endearment which might have been in use in the family named Endicott, who owned the estate for many years, rather than to seek it in the name of Robert Cotta, who was not, so far as we know, in any manner nor at any time connected with Cat Island.

But why indeed, if we knew nothing more, derive the name of the island, any more than the name of Cat Cove, from any other source than the word "Cat?" Cat Island was granted to John Endicott while he was governor, on his own request. It must, therefore, have had a value. For what purpose? Hardly for agriculture; possibly for its timber; more probably as a fishing station, or a station for transport and freighting vessels on their way to Boston. In this case, we might well have supposed that it took its name, and perhaps Cat Cove as well, from the craft called Cat, or Cat Boat, a vessel of Norwegian origin, so numerous at one time in the Bay of Plymouth, England, as to have given to part of that harbor the name of Catwater.

Unfortunately, however, for all these hypotheses, a close examination of the actual spelling of the early records shows that they are all groundless, and remands the conscientious antiquary to his original uncertainty.

The grant from the Colony to John Endicott, in 1655, is to be seen at the State House. It describes the estate as CATTA ISLAND. The will of John Endicott, dated on the "2nd day of the 3d mo. called May" 1659, may be seen at the Suffolk Registry of Probate; so may an inventory of his estate made after his death in 1665; both these describe the property as CATTA ISLAND. At the Essex Registry of Probate, a contemporary copy of the will of John Endicott, made May 23, 1666, as well as the original of the will of Zerobabel Endicott, the survivor of his two sons, dated Nov. 23, 1683, and an official copy of the same made in September, 1684, are on file. All these describe the island by the name of CATTA. Cat Cove had been called "Catt Cove" since 1638, when Roger Conant had a house there. And Robert Cotta, Cotty, or Cottie, is never known to have indulged in that delightful orthographic license which our ancestors enjoyed, but which we have surrendered, to the extent of writing his name with the letters CATTA.

In a deed from an heir of the governor to Richard Reed of Marblehead, dated Boston, March 10, 1687-8, the island is conveyed and is described as being "commonly called and known by ye name of Catt Island." A second inventory of Zerobabel's estate, dated March 4, 1696-7, also describes it as "Catt Island att the mouth of Marblehead Harbor." Thus it seems clear that, whatever was the origin of this singular designation, it attached itself to the island before 1687; that it was an abbreviation of CATTA, and not in any way associated with Robert Cotta, nor with the daughters of Zerobabel Endicott; whether with the Cat Boat, which may have come down to us from the Norsemen,—whether with *Felis domestica*, the "harmless, necessary cat," we cannot determine.

CATTA is a Latin synonyme for *felis*, and Gov. Endicott, who was enough of a linguist to speak French, was not averse to interjecting a foreign phrase now and then in his manuscript records, a practice quite in accord with the fashion of his times. Moreover, the word CATTA has been used, the lexicographers tell us, as the name of a sea-craft, at least since A. D., 1071, and probably much longer. How much the *ἄζατος* of Herodotus and Pindar, —the *ἄζατιον* of Xenophon and Thucydides, in which Plutarch says Cæsar made his escape from Alexandria and the wiles of Cleopatra—had to do with the origin of this word for "boat," we must leave to conjecture.

A century later, this spot inspired an interest somewhat graver than questions of philology excite. 1773-4 was a year of tumult. It was the year of the Boston Tea Party and the Boston Port Bill. The people of this province had lost confidence in the good faith of the only government they had, and were not yet able to see their way to the establishment of another. Lawless violence stalked abroad, and society seemed, for the time, to be thrown back upon its elemental forces. Week by week the feeling about the importation of tea grew intenser and more threatening. The daily journals teemed with protest and denunciation. Hutchinson's secret letters had been sent home by Franklin and read in the assembly. Accounts of burnings in effigy, and coats of tar and feathers, were as frequent as are runaways and coasting accidents to-day. In the midst of all this, as if to make confusion worse confounded, the scourge of small-pox, absent for many years, reappeared in Massachusetts Bay. The terror which the loathsome disease inspired, and the relief experienced from the new mode of treatment by inoculation, are well indicated in the narrative of an incident in the history of Cat Island, which we transcribe

from the contemporary journals of the period. Now that vaccination has so nearly eliminated this from our list of terrors, it is not easy to reproduce the scene of panic it created. Men shunned one another; tradesmen could with difficulty be persuaded to bring the necessaries of life to market, and sacred family ties seemed unable at times to bear a strain too great for human nature. Daily bulletins from Boards of Selectmen announced the lowest number of cases which could from day to day be charged against their respective precincts; and to allay those hideous suspicions which panic engenders in feverish times, rewards were offered for evidence to convict unknown persons of maliciously spreading the contagion about the streets.

The year 1773-4 was probably the most crowded single year in our local history. That year witnessed the last session of the Provincial Assembly; the first session of the Provincial Congress; one following close upon the other in the Town House at Salem;<sup>15</sup> and in the midst of this momentous session the first great fire in Salem occurred, consuming the Tabernacle Meeting House,<sup>16</sup> the Custom House, fourteen shops and eight dwellings, besides injuring and greatly imperiling the Town House itself. It was the same year in which Thomas Hutchinson quit the executive chair of the province for England, and Thomas Gage, the first military governor, succeeded him and established military headquarters, with two companies of the 64th regiment of the line, at the Collins Farm, in Danvers, whitening the Neck soon after with the tents of the 69th regiment from Halifax. Timothy Pickering was twenty-nine years of age, that

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<sup>15</sup> Which stood on the corner of Essex and Washington streets, near the southern parapet of the tunnel.

<sup>16</sup> Which stood on Essex street, opposite Barton Square.



year, and Elbridge Gerry, thirty. In that year Marblehead was second in importance only to Boston among the leading towns of Massachusetts,—probably of New England,—while Salem, fourth on the list by the census of 1765, the earliest census of which we have authentic data, was behind her neighbor in gross population, as well as in the number of houses and of families, in taxable property and perhaps in tonnage.<sup>17</sup> A drive to Marblehead was then an indispensable requisite of Salem's hospitality to strangers.

In that year, systematic general inoculation first came into favor here. Inoculation had been in use in America since 1720, and in common use since 1760.

The nature of the disease, from which inoculation was proposed as an escape, is not such as to invite discussion. Vaccination, introduced at the end of the last century,<sup>18</sup> enables us to escape the sickening contemplation of it as a matter of general concern; but our ancestors were not

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<sup>17</sup> Nov. 27, 1714, the Churchmen of St. Michael's, at Marblehead, petitioned the Bishop of London for an English Clergyman, and described their town as "next Boston, the greatest place of Trade and Commerce within this Province." By the census of 1765, Salem and Marblehead compared as follows:—

	Population.	Houses.	Families.
Salem	4427	509	923
Marblehead	4954	519	935

Dartmouth, now New Bedford, was also then ahead of Salem. In the sermon on the ordination of Rev'd Ebenezer Hubbard over the First Church at Marblehead preached by Rev'd Elias Stone, Jan'y 1. 1783, the town is described as "before the American Revolution, swarming with inhabitants, a pattern of industry, flourishing in trade, abounding with wealth. From its numbers and opulence, as from a fountain, streams of wealth flowed out, which greatly enriched the vicinity and penetrated far into the country. About 1770, Marblehead was supposed next to Boston in population, bearing a proportion in the Province Tax next to Boston, and thought at that time to have imported more hard money than any other town in the province."

<sup>18</sup> Dr. Jenner vaccinated his first patient May 14, 1796, and on July 1st following and several subsequent dates, inoculated him without effect, thus demonstrating the success of his system. The same year, the system was introduced into America by Dr. James Jackson and Dr. Waterhouse. Dr. Thomas Pickman performed the first vaccination in Salem, Oct. 5, 1800.

so fortunate. It was to them one of those horrors too ghastly to confront. Deadly to a degree almost incomprehensible to us, its lethal force was perhaps its least offensive characteristic; for when not fatal, it left behind it blindness, debility, and the seeds of disorders only less desolating than itself. Just before the settlement of Cape Ann, it had completely depopulated this region of its native stock, and if we charge that familiar fact to the exposures and irregularities of savage life, what shall we say to the correlative fact, that of the patients under the best known scientific treatment in London Hospitals, thirty per cent. of those stricken with it died? In spite of inoculation, which Lady Mary Wortley Montagu had introduced from Constantinople in 1718-20, but which made slow progress, one-tenth of all the deaths in England, during the last half of the last century, were deaths from small-pox.<sup>19</sup> The statistics for New England cannot be very different. Private diaries of persons in the most favored positions in life are full of the records of friends sacrificed to this pest. Judge Lynde of Salem, though chief justice of the province, more than once removed his family from his house, and once sent them into the country and from place to place, to avoid danger during a period of contagion; and was once the recipient of an anonymous letter charged with the deadly infection, from the effect of which he happily escaped; and this too in the Revolutionary period, when a celebrated German surgeon, attached to the Hessian troops, Dr. Johann David Schöppf, writes home that in America inoculation is an "almost universal practice."

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<sup>19</sup>The disease was no respecter of persons, but like death in all its forms, *æquo pulsat pede pauperum tabernas Regumque turres*. May 10. 1774. surrounded by all the splendors of Versailles, Louis XV. at the age of sixty-four, King of France since his fifth year, died a miserable death from a second attack of small-pox, a disease which he had had in youth and which he gave to the two princesses, his daughters, who attended his death bed.

In the light of modern science, inoculation seems to be an inadequate, if not a dangerous resort, and is now prohibited by law. It did not do away with the danger of infection as vaccination does, nor in any way decrease it. To some minds, the bringing together, at one point in a hospital, of so great a number of persons suffering from such a disorder, seemed likely to form a centre of propagation which might imperil the neighborhood. Moreover, the advocates of inoculation did not unite their forces in a vigorous struggle with its opponents, but were very much divided among themselves in our neighborhood, at the time in question, between two systems of practice, differing mainly in the application of mercurials. Before inoculation, pest-houses had been provided in out-of-the-way places, where the disease could be isolated and treated by nurses who had passed successfully through it. Beyond this, and the killing of all stray dogs and roping off of streets and sometimes of whole towns which were infected, little could be done.<sup>20</sup>

Lady Montagu, during her stay at Constantinople, found inoculation in common use there, and much prized by women as a protector of their beauty. She herself had lost her eyebrows from the ravages of small-pox, and counted her brother among its victims. With characteristic sagacity and nerve she applied the new treatment to her own children, and finally succeeded on her return to England, in recommending it to general attention. It was first practised in America, at Boston, in 1720, and though Increase Mather, with other leaders of the clergy,

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<sup>20</sup> Vessels were constantly bringing the disease from Barbadoes and in these cases their crews and cargoes, especially of cotton-wool, were often landed on Misery or Baker's Island. Harvard College was more than once dismissed on account of its prevalence, and many times the General Court was adjourned from place to place to escape it. Highways from town to town were securely fenced and guarded, and ferry boats discontinued.

brought all their priestly influence to bear in its favor, its adherents made slow progress. Nov. 20, 1721, there was but one physician, Dr. Zabdiel Boylston,<sup>21</sup> known to countenance and encourage the practice in Boston, though Mather argued the lawfulness of it on scriptural grounds, gravely urging: "Furthermore, I have made some enquiry, whether there be many persons of a prophane life and conversation that do approve and defend inoculation, and I have been answered that they know but of very few such. This is to me a weighty consideration. But on the other hand, though there are some worthy persons that are not clear about it, nevertheless it cannot be denied, but that the known children of the wicked one are generally fierce enemies to inoculation."<sup>22</sup>

It was claimed in behalf of inoculation, that it relieved those who submitted to it, for the rest of their lives, of the habitual and universal dread of taking the disease in the natural way. The unspeakable value of such exemption is obvious. Moreover, it was also demonstrated, that the disease thus artificially produced in a system previously skilfully prepared to receive it and developed under scientific conditions, in every way the most favorable, was not more dangerous nor afflictive than many others. Instead of amounting to one in three, four, or five of those affected, the number who died under the new treatment was found not to exceed one in seven hundred or a thousand, and was often stated much more favorably, and thoughtful people congratulated themselves that at last "that disease, which, taken by chance, hath proved the Bain of Tens of 'Thousands, now comes cloathed in gentleness,—all its Terribleness cast aside."

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<sup>21</sup> Dr. Boylston's life was threatened and adverse legislation attempted.

<sup>22</sup> Collections Mass. Hist. Soc., 1st ser., Vol. IX, pp. 275-80.



Washington was inoculated at New York, June 27, 1776. In that year, small-pox raged in Boston which was occupied by the British. A general inoculation was ordered there, July 3. These general inoculations required very extensive hospital accommodations. Cat Island had been early recognized as a desirable site for an establishment of this nature, and leading citizens of Marblehead, Salem, Beverly, and Lynn, had asked the needful permission of the Provincial Assembly.

The island had a sufficient area, with pure air, fine views, and a natural spring of water. It was of easy access, yet at a safe distance, and was at that time not wholly cleared of its growth of timber. It was purchased in equal shares, by four of the most prominent citizens of Marblehead: Col. Azor Orne, Elbridge Gerry, Esq., Capt. John Glover, and Jonathan Glover, Esq., and their enterprise and means secured, on a generous scale, the erection during the summer of 1773 of the needful buildings, at the high, rocky headland, near the spring of water. Even before their completion, popular distrust had begun to show itself and had so far prevailed over good sense, that on Sept. 19, a town meeting had been called at the instance of indignant opponents of the scheme, and the license granted by the town had been revoked. The projectors of Essex Hospital, however, were not the men to be daunted by popular clamor. Among them were the town's representatives in the general assembly and on the committees of correspondence. In a larger sense, they were representatives of the industry, wealth, and intelligence of the town. They had in hand a private enterprise of great public importance, and in order to demonstrate to their townsmen that a desire for personal profit was not among their motives, they made a public offer to the town of the whole property at cost.

This being declined, they pushed on the work with characteristic energy, and October 19, opened the Essex Hospital to the public with the sanction of the Provincial Assembly and under a rigid system of rules duly approved by the "gentlemen selectmen of Salem and Marblehead."

One of the selectmen of Salem was Timothy Pickering, jr., at that time captain of the 4th Salem Company in the 1st Essex Regiment of Infantry, of which he soon after became colonel. He threw himself with the same boldness and enthusiasm into the controversies growing out of the small-pox excitement of that year, as he did into every other on which he entered. A prolific and telling writer on military, patriotic, theological and political topics, he was at the same time engaged in a furious newspaper warfare with Rev. Dr. Whitaker in the *Essex Gazette*, as to which was the better of the two prevailing methods of inoculation, and had that summer made a saddle-journey alone to Albany, in the Province of New York, to secure the services of a celebrated surgeon attached to the Eighth (King's) Regiment of Foot, who practised the much-vaunted Suttonian method. This step he took as overseer of a hospital for inoculation, then building near Castle Hill in Salem, in "the great pasture common," which seems to have been the second institution of the kind opened in this province, the Essex Hospital alone being completed before it. Of Mr. Gerry, it is proper to say that he had in early life given much attention to medicine, a profession to which he was inclined and for which his father destined him; but the troubles of his country summoned him to more conspicuous service.

It will be seen that the sanction of the selectmen of Marblehead for the opening of the Essex Hospital was granted after an expression of public disapproval and dis-

trust by the citizens of the town, and this fact probably explains the occurrences which are to be narrated.

Besides generous kitchens and quarters for a steward, physicians, nurses and attendants, the hospital buildings contained an assembly room and ten large lodgings, each well-furnished for eight or ten patients. Eight persons might, before entering, club together and secure a room to themselves; otherwise, patrons were admitted and assigned rooms in the order in which their applications were recorded. Major Richard Reed kept, at his place of business in Marblehead, the class books, so called, in which the names of applicants were entered, and Jonathan Glover signed for the proprietors. An island guard and a crew of picked boatmen were enlisted and these were placed under oath. The regulations, which were published, provided that the guard "shall suffer no person to land on the island and no person to embark therefrom" without written passport. No letters can leave the island on any account. The average admittance fee seems to have been twelve dollars, payable in advance,—the average term of sojourn, four weeks, and a bond was given on entering, to insure the strict observance of regulations. A "coasting sloop" was provided for transportation, and these, with the addition of the usual out-buildings for the storage of uninfected clothing, for fumigation and the like, the whole intrenched behind a picket-fence with gates and sentry-boxes, completed the elaborate arrangements at this Castle of Uncleaness.

At the top of the main building, three stories in height, was constructed a system of signals by which the exact state of affairs on the island could be telegraphed ashore; and hundreds of anxious observers, all along the bay, may well be supposed to have levelled their glasses at sunrise for the daily bulletin, with a foreboding scrutiny

not unlike that with which the poet Key, at a later period, spied out the starry flag on Fort McHenry.

The establishment thus equipped, the first of the kind in the country, was placed in charge of two eminent specialists in their department of physic, Dr. Hall Jackson of Portsmouth, N. H., who had practised in London, and an assistant, Dr. Ananias Randall, from Long Island. The American, and not the Suttonian method, was practised, and to this Col. Pickering soon became a convert. Besides the professional supervision thus secured, the enterprise enjoyed the countenance and endorsement of eminent local practitioners, who made haste to enter themselves as patients. Dr. Ebenezer Putnam, sen'r, of Salem, "set off for Cat Island" for inoculation, October 25, and on Nov. 12, he with Dr. Elisha Whitney of Beverly, and Drs. Nathaniel Bond and Elijah Dix, united in publishing a card as patients of the Essex Hospital. Dec'r 3, Dr. Humphrey Devereaux, a leading physician of Marblehead, died there, at the age of 43, "universally regretted." Col. Peter Frye, Mr. Eaton, and other leading citizens of Salem, were there as patients.

The first class entered Essex Hospital, Oct. 19, 1773. It consisted of 103 persons of both sexes, filling the institution to its utmost capacity, went down "in high spirits," and, as the buildings and outfit were all fresh and uninfected, was not unnaturally attended to the island by a very large concourse of the best quality of the neighborhood. After leave-taking in the assembly room, the island was cleared of the throng and inoculation proceeded. The high spirits with which the party entered upon this strange experience suffered no abatement. Death did not invade their ranks, and so mild a type of the disorder was induced, notwithstanding the autumnal weather which was accounted as a little unfriendly for the first



venture, that we find them "daily displaying their signal of Health from the middle of the Island:"—"all in high spirits" Oct. 25,— "indeed confined to a strict regimen, but they may every day be seen walking the Island, shooting wild fowl, playing at quoits,—some wholly without marks,—in all stages of the disease their windows daily open,—exposing themselves to the open air in all weathers,"—down to Oct. 29; and on Nov. 5, duly commemorating the "happy Deliverance of the English Nation from the Gun Powder Plot" with tar barrels brought from Marblehead, with which they "displayed a large fire from the Middle of the Island, and the Hospital Illuminated, making a most beautiful appearance." Rockets were ordered from Boston, and were "played off by a number of gentlemen who spent the Evening at the Assembly room," and all passed "very jovially for them and for their friends and acquaintances under Inoculation." Dec. 4, in firing a salute, it does not appear for what occasion, Capt. Lowell of Newburyport, a patient only twelve days under inoculation, blew off both his arms and shattered his upper jaw and nose, yet he was discharged in thirty-seven days, recovered so far as was possible from these and other frightful injuries, with the sight of one eye restored,—a striking testimony to the curative skill and good management which prevailed there. Clergymen were not lacking among the patients to conduct the usual services of Sunday.

Thus successfully did this important undertaking seem to be initiated, and the first, second and third classes, each of a hundred or more members, had already passed the ordeal, the Salem Hospital at Castle Hill having in the meantime been erected and opened. Applications crowded the class books too fast for admission, and the patients, returning from treatment, left the island with

keen appetites, a grateful sense of exemption from future peril, and often in better general health than they enjoyed before entering the hospital.

Unhappily, in bringing ashore a portion of the third class, some irregularity occurred, from an attempt to land them at a point other than that designated by the authorities. The magazine of popular indignation was fired in an instant. General distrust and alarm took possession of the town. Angry collisions occurred. The Hospital Boat was burned. Jan'y 19, four Marblehead men were caught attempting, as it was charged, to introduce into town clothing which they had stolen and brought ashore from the island. "A large body of Mobility" met at the Town House next morning, says the Essex Gazette, and having, "by a great majority, determined that the Mode of Punishment should be Tarring and Feathering," proceeded to execute their sentence.

Of the excesses which immediately preceded and followed this outbreak, we have, besides the contemporary chronicle of the Essex Gazette, which might be thought to be colored by the excitement of the hour, a carefully digested statement, dated Marblehead, February 8, 1774, signed by fifty of the most substantial citizens of the town, and placed on file, Feb. 12, with the Provincial Assembly then sitting at Boston. It bears the names, among others, of Jeremiah Lee, who seems to have drawn it, of Joseph and of William Lee, of both the Glovers, of Richard and Samuel Reed, of Robert Hooper, *tertius*, of Joseph Hooper, of Thos., Thos., jr., and Elbridge Gerry, of Richard Phillips, of Azor and Joshua Orne, of John Gallison and John Sparhawk, of Edward Fettyplace and Burrill Devereaux. It is addressed to "His Excellency, Thomas Hutchinson, Esq., the Honorable, His Majesty's Council, and the Honorable House of

Representatives in General Court assembled." It begins as follows: "May it please your Excellency and Honors. Your Petitioners, being Inhabitants of Marblehead, and conceiving that their Lives, Liberties and Properties have not the least Protection from the Laws and Government of the Land, beg leave to submit their unhappy Circumstances to your wise consideration, and Humbly Implore your Patience to a True Narration of Facts."

From sources of information such as these, unimpeached and thoroughly worthy of credit, it appears that the reign of terror began as early as the night of Jan'y 11, and continued with little abatement until the end of February. That on Jan'y 12, the mob "blackened themselves" after being "plyed with strong liquors for several hours," and beset the house of Jonathan Glover, who planted in the hall behind his open front door a loaded cannon, and declared his readiness to receive their visit. That they broke his windows, and demanded the Deputy Sheriff, Brown, whom they supposed to be on duty in town, to take the offenders who fired the Hospital Sloop the night before. That they declared their intention, so says the petition to General Court, "to have put to a most execruciating death the Deputy, with the High Sheriff, by Boyling them in Oyle." And that "they further embarked to Burn the Hospital, then having forty patients under inoculation, but were happily prevented." The next day, which was the third day, "matters had arrived to such a pitch as to leave it no longer safe for any one to express his dissatisfaction at these proceedings." The disorder increased until Jan'y 15th, when the Proprietors of Essex Hospital made public declaration "that it should be closed until the town should think it necessary to be opened again." This had a quieting effect; but on the 17th, persons appeared blacked, in the evening, in all

parts of the town, and the Design was again disclosed of Burning the Hospital. "Preparation was thought on to defend it," and the design was abandoned. The lives of attendants who came ashore were threatened, and the keys of the Proprietors' stores and warehouses were demanded. Thus matters stood on Jan'y 20. Meanwhile, the first four victims of the tar-kettle had been secured, and, says the Gazette for that day, "the most extraordinary exhibition of the kind ever seen in North America was drawn forth to public view." The procession formed at the Town House in the morning. First came one thousand people, mostly in uniform, among whom were four drummers. Next rode the "four objects of resentment" in a cart facing each other, each wearing a coat of tar and feathers; a fifer and one drummer being placed in the front of the carriage, from which a large white flag was displayed. In this manner they marched to Salem, and entered the town about twelve o'clock. Here, forming a junction with a numerous body of the inhabitants, they paraded the principal streets, drums beating, fife playing, and flag flying from the cart, "which, with the exquisitely droll and grotesque appearance of the four tarred and feathered Objects of Derision, exhibited a laughable and truly comic scene." They left Salem for Marblehead before one o'clock, and dispersed there on their arrival. By this treatment, the petition asserts, the lives of two of their victims were put in peril. The next evening, Jan'y 21, a body of seven or eight hundred persons assembled, tarred and feathered another "object of resentment," and carted him through town, proclaiming that "they had the Laws in their own hands," and threatening all who should exhibit fire-arms, thus "depriving such as apprehended themselves in dan-



ger of their only defence, in a Perfect state of Anarchy and Confusion."

We are not unprepared for the sequel. On Jan'y 24, "a Meeting was called at Marblehead to put a Stop to the Disorders, which for several days before had happened in the Place. As the Dispute respected the Essex Hospital, it was agreed by the Proprietors to shut it up." The account is taken from the Petition and from the Essex Gazette. At their Desire, a Committee of the Town was chosen to inspect the Operation. "Next day, the Committee went to the Hospital and attended their Business until the following Night, Wednesday, Jan'y 26, when they awaked with the Rest of the Family, being eleven in Number, surrounded with Flames. The Ruffians, who perpetrated this act, went from the Town prepared with Tar Tubs, etc., and proceeded setting Fire to all Parts of the House, without any Attempt to awake the People. So infernal were the Villains, that they struck down one Man, who in Amazement had jumped from his Bed and was running from the Flames. The Steward had a Blow from another of them with an Andiron, which missed his head and felled him to the Floor. One of the Patients, with a Child at her Breast, was driven to the Smoke House, fainting as she went, and others were turned out, cold as it was, with scarcely any Thing to cover them."<sup>23</sup>

The persons engaged in this outrage numbered about twenty, part of them disguised as Mohawks; the loss to the proprietors was estimated at Two Thousand Pounds,

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<sup>23</sup> The same issue of the paper states that the Frost has nearly completed a bridge from Castle Island to the mainland in Boston Harbor, that Charles River was frozen over so that there was foot-passage from Boston to Charlestown, that the Beverly Ferry was froze over so that they pass and repass on the ice, and that navigation was at a stand in Salem, the Harbor being entirely froze up.

L. M., and a military watch of forty men was at once established at Marblehead, the Confusion being such that Lives and Property were not thought safe without it.

The General Court was next appealed to, in the petition already quoted. This closed by showing how Reverend Ministers had been abused for bearing religious testimony against the outrages, being threatened with having their houses pulled about their ears; that the Salem Hospital was threatened, and the workhouses, that they should be burnt and the keepers with them; that vessels were threatened with scuttling; and that "should Government remain longer unrestored, assassinations, which have already been threatened, will, we fear, be the unhappy consequence." "Your Petitioners beg leave to shew that, amidst all these Tumults, not a magistrate has there been to command the peace."

In answer to this humble petition for "such speedy relief from these grievous circumstances as in their great wisdom may seem meet," the Provincial Assembly appointed an investigating committee of both Houses, which was instructed to repair to Marblehead and "inquire into the grounds of the uneasiness subsisting there." This Committee reported, Feb. 18, supposing the danger over.

Feb. 25, Deputy Sheriff Brown, of Salem, went in the forenoon to Marblehead and arrested two persons on board a fishing vessel, in an action for £3,000 brought by the "gentlemen who were Proprietors of the late Essex Hospital, on suspicion that the said two Persons were concerned in burning that building. The prisoners were committed to his Majesty's Gaol<sup>24</sup> about 2 o'clock P. M.

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<sup>24</sup>This Gaol was at the corner of Prison Lane, now St. Peter's street, and County now Federal street, and had an open yard on the easterly side of it, extending to Prison Lane. The present residence of Abner C. Goodell, Esq., is in part the same structure and contains some of the identical timbers.

Almost as soon as the Keys were turned upon them, the People began in small Companies to enter the Town from Marblehead, and continued coming over in this Manner, till near Night, rendezvousing near the Gaol. The Magistrates were busy in consulting upon Measures for preserving the Peace, and for dispersing the People who were assembling from Marblehead, from whence a still greater Number was expected after dark. About Sunset, on Application to the Colonel of the Militia, the Drums were ordered out and beat, *To Arms!* Immediately upon hearing this, the Mob to the numbers of 4 or 500, arming themselves with Clubs, Sticks of Wood, etc., and while it was yet Day Light, made a most furious attack upon the Gaol. They first burst open the Doors and broke most of the lower windows in that Part of the Building which is the Prison Keeper's Dwelling,—and then with Iron Crows, Axes, etc., they soon beat their way through four of the Prison Doors, each of which was very strong and well secured with many large Locks. Thus, having got into two Apartments of the Prison, in less than 10 Minutes from the first Onset, they carried off the above mentioned two Prisoners in Triumph to Marblehead."

On Monday, Feb. 28, the High Sheriff of the County (Richard Saltonstall, who had advertised a reward for the apprehension of the jail-breakers) gave orders to his deputy in Salem to command the Inhabitants to meet in School Street (now Washington, north of Essex Street) at 9 o'clock the next Morning, with Arms and Ammunition according to Law, to assist the High Sheriff in the Execution of his Office.

"In Pursuance of this Order, several Hundred were commanded to appear. This Body, when assembled, was to march to Marblehead and assist the Sheriff in

retaking the Prisoners as well as to apprehend the Principals concerned in breaking the Gaol. On the other Hand it was given out that the Marblehead People, to the Number of six or eight hundred, were arming and were determined to repel to the last Extremity, any Force that should be brought against them. In this critical Situation of Things, a Number of the principal Gentlemen of Marblehead were happily instrumental in effecting a Compromise: the Proprietors of the late Essex Hospital being influenced to relinquish all Demands that they might have either on the County or Sheriff, in Consequence of the Rescue and Escape of the above mentioned Prisoners, and to discontinue all Proceedings respecting the Burning of the Hospital. This Measure, which restored Peace, was reported abroad just before the Time at which the People were ordered to assemble, and was the Cause of great Joy and Satisfaction to the Town in general." With the subsequent beating of Clark, one of the four who were first tarred and feathered, and who was again dragged from his bed at night by twenty men and whipped at the post before the Town House in Marblehead, this disgraceful transaction seems to have closed.

Unfortunate as the occurrence was, it barely escaped more serious consequences of a political nature. Such was the sense of outrage on the part of the Proprietors of the Hospital, that they declined all further service in town affairs and threatened to leave town. This action not only vacated the places of deputies in the Assembly, but left Marblehead without a committee of safety and correspondence at that critical moment when, the Boston Port Bill being but a few days off, the second town in New England was about to be called on to render incalculable aid and comfort to the distressed capital of the Province. To avert this catastrophe Samuel Adams made it his special



care and duty, and wrote to Elbridge Gerry patriotic words, which fitly close this strange narration.<sup>25</sup>

Austin says "This act of violence, following soon after the destruction of the tea in Boston Harbor, was urged by the advocates of the ministry as the natural effect of a bad example. To the friends of the people this was peculiarly mortifying. It was with extreme regret that in a place considered as patriotic as Marblehead, a disgraceful scene of riot and ruin should have been exhibited, which could not fail to be turned to their disadvantage in the great contest on which they were entering."<sup>26</sup>

[MR. ADAMS TO MR. GERRY.]

BOSTON, MARCH 25, 1774.

MY DEAR SIR:

While the general court was sitting, I received a letter from you relating to the unhappy circumstances the town of Marblehead was then in; but a great variety of business, some of which was very important, prevented my giving you a convincing proof at that time, of the regard with which I am ever disposed to treat your favours. Besides, if it had been in my power to have aided you with advice, I flattered myself, from the information I afterwards had, that the storm, though it raged with so much violence, would soon spend itself, and a calm would ensue. The tumult of the people is very properly compared to the raging of the sea. When the passions of a multitude become headstrong, they generally will have their course: a direct opposition only tends to increase them; and as to reasoning, one may as well expect that the foaming billows will hearken to a lecture of morality and be quiet. The skilful pilot will carefully keep the helm, and so steer the ship while the storm continues, as to prevent, if possible, her receiving injury.

When your petition was read in the house, I was fearful that our enemies would make an ill improvement of it. I thought I could discover in the countenances of some, a kind of triumph in finding that the friends of liberty themselves were obliged to have recourse even to military aid, to protect them from the fury of an ungoverned

<sup>25</sup> See Wells's *Life of Samuel Adams*, Vol. II, pp. 154-5.

<sup>26</sup> See Austin's *Life of Elbridge Gerry*, Vol. I, pp. 33-42.

mob. They seemed to me to be disposed to confound the distinction; between a lawless attack upon property in a case where if there had been right there was remedy, and the people's rising in the necessary defence of their liberties, and deliberately, and I may add rationally, destroying property, after trying every method to preserve it, and when the men in power had rendered the destruction of that property the only means of securing the property of *all*.

It is probable that such improvement may have been made of the disorders in Marblehead, to prejudice or discredit our manly opposition to the efforts of tyranny; but I hope the friends of liberty will prevent any injury thereby to the common cause: and yet, I cannot but express some fears, that parties and animosities have arisen among the brethren; because I have just now heard from a gentleman of your town, that your committee of correspondence have resolved no more to act! I am loth to believe, nay, I cannot yet believe, that the gentlemen of Marblehead, who have borne so early and so noble a testimony to the cause of American freedom, will desert that cause, only from a difference of sentiments among themselves concerning a matter which has no relation to it. If my fears are groundless, pray be so kind as to relieve them, by writing to me as soon as you have an opportunity. I shall take it as the greatest act of friendship you can do me. Indeed, the matter will soon be put to the trial; for our committee, without the least jealousy, have written a letter to yours, by Mr. Goddard, who is the bearer of this. The contents we think of great importance, and therefore I hope they will have the serious consideration of the gentlemen of your committee.

I am, with strict truth,

Your's affectionately,

SAMUEL ADAMS.

ELBRIDGE GERRY, ESQ.

[COMMITTEE OF CORRESPONDENCE TO MR. GERRY AND OTHERS.]

BOSTON, APRIL 2, 1774.

GENTLEMEN:

Yesterday we received your letter dated the 22nd of March, wherein we have the disagreeable intelligence of your "having resigned the several offices in which you have acted for the town of Marblehead," and that you shall "accept them no more — without material alteration in the conduct of the inhabitants."

When we heard of the unhappy circumstances of that town, the contest that had arisen to so great a degree of violence on account of the hospital lately erected there, it gave us great concern and anxiety, lest it might issue to the prejudice of the common cause of American

freedom. We were apprehensive that the minds of the zealous friends of that good cause, being warmly agitated in such a controversy, would become thereby disaffected to each other, and that the advantage which we have hitherto experienced from their united efforts would cease. We are confirmed that our fears were not ill-grounded, by your relinquishing a post, which in our opinions, and we dare say, in the opinion of your fellow-townsmen you sustained with honor to yourselves and advantage to your country. But, gentlemen, suffer us to ask, whether you well considered, that although you derived your being as a committee of correspondence from that particular town which appointed you, yet in the nature of your office, while they continued you in it you stood connected in a peculiar relation with your country? If this be a just view of it, should the ill conduct of the inhabitants of Marblehead towards you, influence you to decline serving the public in this office any more than that of the inhabitants of this or any other town? And would you not therefore have continued in that office, though you had been obliged to resign every other office you held under the town, without injury to your own reputation? Besides, will the misfortune end in this resignation? Does not the step naturally lead you to withdraw yourselves totally from the public meetings of the town, however important to the common cause, by which the other firm friends to that honourable cause may feel the want of your influence and aid, at a time when, as you well express it, “a *fatal* thrust may be aimed at our rights and liberties,” and it may be necessary that all should appear, and “as one body oppose the design and defeat the rebel intention?” Should not the disorders that have prevailed and still prevail in the town of Marblehead, have been a weighty motive rather for your taking measures to strengthen your connexions with the people than otherwise; that you might in conjunction with other prudent men, have employed your influence and abilities in reducing to the exercise of reason those who had been governed by prejudice and passion, and thus have brought the contest to an equitable and amicable issue, which would certainly have been to your own satisfaction? If difficulties stared you in the face, it is a good maxim, *nil desperandum*; and are you sure that it was impracticable for you, by patience and assiduity, to have restored “order and distinction,” and rendered the public offices of the town again respectable?

It is difficult to enumerate all the instances in which our enemies, as watchful as they are inveterate, will make an ill improvement of your letter of resignation. And therefore we earnestly wish that a method may yet be contrived for the recalling of it consistent with your own sentiments. We assure ourselves that personal considerations will not be suffered to have an undue weight in your minds, when the

public liberty in which is involved the happiness of your own as well as the children of those who have ill treated you, and whom to rescue from bondage will afford you the most exalted pleasure, is in danger of suffering injury.

We wish most ardently that by the exercise of moderation and prudence the differences subsisting among the good people of Marblehead may be settled upon righteous terms. And as we are informed that the town at their late meeting did not see cause to make choice of other gentlemen in your room in consequence of your declining to serve any longer as a committee of correspondence, we beg leave still to consider and address you in that character.

We are, with unfeigned respect,

WILLIAM COOPER, Clerk.

By order, and in behalf of the Committee  
of Correspondence for Boston.

*To gentlemen of the Committee of Correspondence  
for Marblehead.*

The gentlemen addressed resumed their places on the Committee, and so the Cat Island Imbroglio ended.

#### AFTERNOON SESSION.

By the polite invitation of Col. William L. Palmer, the lessee of the island and the buildings thereon, the Institute selected this pleasant seaside resort for one of its Field Meetings.

The large hall, erected for the various entertainments incident to these places, was appropriated for the use of the Institute during the day, and here were spread the tables for the lunch at 1 P. M., and at 2.30, the afternoon session was held.

The Meeting was called to order by the PRESIDENT. The records of the last meeting were read by the Secretary, and the usual routine of business was transacted.

The PRESIDENT alluded briefly to the progress that had been made in scientific research, and the increased



facilities for pursuing the same in our various educational institutions within the past fifty years. At that time public attention was being awakened to the importance of these investigations. Societies having these objects in view were organizing, the general government and the legislatures of the several states were making appropriations for scientific surveys of their respective domains, and the same were under consideration.

The introduction of the use of the dredge, the trawl, etc., by naturalists, especially by those connected with the U. S. Fish Commission, has been instrumental in adding largely to the knowledge of the marine fauna and flora of our coast. The arrival of Prof. L. Agassiz in this country, in 1846, marks an important era in the history of science. His lectures before the Lowell Institute, and elsewhere in the United States, created a zeal and interest in zoölogical studies; the formation of the Museum of Comparative Zoölogy at Cambridge, under his auspices, and the great progress in the development of his plans since his decease, by the liberality and persevering energy of his son A. Agassiz, will long remain as a lasting monument to his great and careful labors in this direction. Many of his pupils are now holding professorships in several of our colleges and schools of learning, and are doing good work in the promotion of the natural sciences.

The PRESIDENT then introduced the REV. SERENO D. GAMMELL, of Boxford, who made a brief and practical address, in which he compared the vastness of the ocean with the limitless domain of knowledge; but this largeness of the field should not discourage the beginner, for the more one studies, the more he will be interested, and the mind will be absorbed in the research and investigation. He also spoke of the power of self-restraint,

which is an evidence of manliness, as one of the incidental results of studious habits.

MR. H. SAZE, a Japanese student attending the Summer School of Biology, was introduced, and gave an interesting account of the cultivation of rice in a northern province of Japan. The following is an abstract of his remarks :—

The seed is usually sprouted before sowing. This is done by soaking it in water and then exposing it to the warm sun. It is sown broadcast, very thickly over a small patch of prepared soil which might be called a nursery. The plant grows in the nursery until it reaches the height of six or seven inches. Then it is transplanted.

The rice field is ploughed, manured, watered, and thoroughly stirred in early spring. The water must stand about three inches deep. Hence, the necessity of dividing the field into compartments. About the beginning of June, the transplanting commences. The young plants are set out in regular rows of bunches, six, seven, or eight inches apart. Before the plant advances too far in its growth, two or three weedings are usually necessary. The water is finally drawn off. The harvesting takes place during October. The cutting is done with the sickle.

The grain is threshed early in the winter. One handful after another of the straw is taken up, and the grain separated from it. The straw is kept for ropes, shoes, mats, etc.

The chaff is ground off by means of a large wooden or clayey handmill, not heavy enough to crush the kernel. Before it is ready for the kettle, the rice must be further refined by removing the brown inner seed-

coat which adheres very closely to the kernel. A wooden mortar and pestle are used for this final operation.

DR. GEORGE A. PERKINS, of Salem, who had lived for nine years in a rice-growing country, gave a detailed description of the method of its cultivation as practised upon the western coast of Africa. This method differed in many respects from that pursued in Japan, and was substantially as follows :

The first step in rice cultivation in Western Africa, is the clearing of so much of the waste land as may be needed for a single year, the natives never planting the same land for two consecutive years. This clearing of the land takes place during the dry season, when all the trees and shrubs are cut down and allowed to dry, and is the most difficult and tedious part of the work. Just before the beginning of the annual rains, the wood, being properly dried by the heat of the sun, the whole tract, often of some miles in extent, is burned over; the intense heat destroying all the weeds, and the ashes being all the manure needed.

This tract of land may belong to a town or perhaps several of them, or even the whole tribe; each head of a family has a portion marked off and assigned to him, and this he divides among his wives, of which he may have one, two, or more.

When the first showers, which usher in the rainy season, begin to fall, the women repair to the farms, provided with rice-seed, a large snail shell—which will hold a pint or more—and a miniature spade; with this last held in the right hand, they dig a shallow hole in the earth, and by a skilful motion of the left hand, which holds the shell filled with rice, they let fall from four to eight grains of the seed into the hole; then, by a single

light blow of the spade, the whole is covered and the same operation repeated over the whole field at a distance of six or eight inches apart.

The planted field must then be very sharply watched to preserve it from the ravages of the small birds who visit the farm in thousands. This business is left to the women and children, but often the men must do their share if they hope to have any rice at harvest-time. This watching must be kept up day after day,—and often at night too, when the moon shines,—until the plant has so far grown as to cease to attract the birds. When the rice begins to head, it must again be guarded until it is fit to cut. This cutting is a tedious work, only one head is cut at a time; upon this they leave the straw about eight inches long, and this enables them to tie it in bundles just as large as the hand can grasp. Five of these handfuls are afterward again tied together to make a larger bunch. One of these large bunches seems to be the unit of measure in dealing with one another.

All the crop is to be transported on their heads from the farm to their fenced towns, a distance in most cases of two or three miles; it is there stored in the tops of their conical huts, where it is exposed to the smoke of the fires on the earthen floors below, and this preserves it from the attacks of insects.

When wanted for food, only a single day's rations are cleaned and cleared of the hulls at a time, by pounding in large wooden mortars, and the chaff is fanned away.

PROF. E. S. MORSE, after alluding briefly to the peculiar difficulties of the Japanese language, spoke of the great rocks with which the shore is lined, and which here and there dot the island. It was with reference to the effect upon them, of the glacial period, that explanation was made. Many years ago, the entire country



hereabouts was covered with a vast field of ice, which gradually moved southward. One of the evidences of this moving field of ice is the rounding of the large stones all over New England toward the north, and their ragged precipitous character towards the south; also the presence of bowlders which evidently do not belong to this region. Reference was also made to the glaciers of Greenland and Switzerland.

Prof. Morse exhibited specimens of the *Pupilla muscorum*, which he had found on the island during the day, and considered this a new locality for this species. A communication prepared by him since the adjournment, on "The gradual dispersion of certain Mollusks in New England," contains a description of this *Pupilla*, and is appended to the report of this meeting.

REV. JOSEPH BANVARD, of Neponset, formerly pastor of the Central Baptist church of this city, made some excellent and practical remarks regarding the possibility of every one being able to gather much scientific knowledge, by keeping the eyes open and cultivating the habit of close observation. He urged the young people present to study the simple things in nature, and in so doing, they would not only find great pleasure, but great profit.

MR. N. A. HORTON, of the Salem Gazette, after a few appropriate remarks, offered the following resolution which was unanimously adopted.

*Resolved*, That the thanks of the Essex Institute be tendered to Col. William L. Palmer, for his polite invitation to hold a field meeting on Lowell Island, and for the courtesies extended to the members and their friends on this occasion.

Adj.

*The gradual dispersion of certain Mollusks in New England.*

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BY EDWARD S. MORSE.

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THE rapid dispersion of Mollusks, as observed in certain species, is of great interest in connection with the general distribution of species from certain centres.

The rapid invasion of large areas, by species not known to have occurred there before, may account for the wide distribution of species through certain geological horizons, where their progenitors in earlier deposits are not known. The sudden appearance of species throughout large geological areas has always been held as a strong point by those who argue against the doctrine of derivation.

In a long study of the Mollusca of New England for the past twenty-four years, I have observed many changes going on in the distribution of certain species which indicates a much more rapid invasion of areas than had before been supposed. Not only do we see this rapid introduction of forms from other centres, but some species of mollusks vary greatly in their relative scarcity and abundance, when observed over considerable lapses of time.

In my little work entitled "Observations on the Terrestrial Pulmonifera of Maine," forming the first part of the Journal of the Portland Society of Natural History, published in 1864, I commented on this change in the relative scarcity and abundance of certain species as compared with the observations made by Dr. J. W.

Mighels, a careful and enthusiastic worker in the same field. His paper was published in the Proceedings of the Boston Society of Natural History in 1843, and was entitled "Catalogue of the Marine Fluvatile and Terrestrial Shells of the State of Maine" (Bost. Jour. Nat. Hist., Vol. IV, p. 308). The following is a brief extract from my paper above mentioned. The lines in quotations being taken from Dr. Mighel's paper, while the contrasts as observed by me are printed in italics.

Mesodon albolabris. "Solitary." *Great abundance.*

Anguispira alternata. "Abundant." *Not abundant, except on islands.*

Hyalina indentata. "Appears to be rare." *Not rare.*

Hyalina electrina. "Rare." *Quite common.*

Conulus chersina is more abundant than his words would seem to indicate.

Strobila labyrinthica. "Found sparingly." *Common all over the State.*

Pupillas and Isthmias. Were noted as found sparingly by Dr. Mighels. Most of the species are quite common.

Zoögenetes harpa. Is now abundant in several parts of the state, and particularly about Portland. Mighels did not find it at the time of the publication of his catalogue.

Succinea avara. Mighels mentions only one locality. It is now common all over the state.

Helisoma bicarinata. "Not aware that it is abundant anywhere." *Exceedingly abundant.*

Ancylus rivularis. "Found in plenty." *One of our scarcest shells.*

Radix ampla. This species was found in great abundance when first discovered in Eagle Lake in the northern part of the state, in company with *Physa ancillaria*.

In company with Mr. John M. Gould, I visited this lake in 1859, and a most careful search revealed only a few dead specimens of *R. ampla*, and not a vestige of *Physa ancillaria*. Mr. Fuller has since discovered the shell on the shores of Lake Sebago.

Dr. C. B. Adams first described a species of land snail known as *Pupilla badia*, as occurring in Vermont. The shell differed very slightly from a European species *P.*

*muscorum*, and as such Adams' species is now recognized, though I have already pointed out some slight differences in the two shells. Since Adams' discovery of the species, in this country, it has been found on certain islands in the Gulf of St. Lawrence, as well as in New York State. In the year 1862, Mr. Charles B. Fuller found it in Maine, near Portland. In some localities near that city, known to have been examined by early collectors without meeting with it, it has been collected by thousands. At Oak island, Chelsea, a famous collecting ground of Dr. Gould, Dr. Binney and others, no evidence of the existence of this species there is recorded. In the year 1860, Prof. W. C. Cleveland found it in the greatest abundance. In this case it can be positively asserted that the species has been introduced within twenty years. The collectors of Salem and Lynn had failed to observe its occurrence in Essex County. Last summer I discovered the species in great abundance on Lowell island in Salem harbor. From these evidences it is quite certain that this minute land shell is being distributed with considerable rapidity.

It will be found that, as in the case of plants, the land species of mollusks are being widely distributed through railway traffic. I have often found, at Portland, minute land shells clinging to firewood that had been brought from the interior of the state.

The remarkable rapidity in the diffusion of *Littorina litorea* is of special interest in this connection. This well-known European species was first observed on this continent by Mr. Willis, of Halifax, N. S., many years ago. Since that time, it has been rapidly and widely diffused along the coast of New England.

In 1870, Mr. Fuller found a few specimens in Portland harbor, and about the same time at Kennebunk in Maine.



It is now found in great abundance along the coast of Maine.

Before the year 1872, it had never been observed in Salem harbor. On the shore of South Salem, a place where I had repeatedly collected, only a single specimen was found in the spring of 1872. It is now one of the most common shells in the harbor of Salem, and actually swarms in countless numbers in all the inlets in the vicinity of Salem.

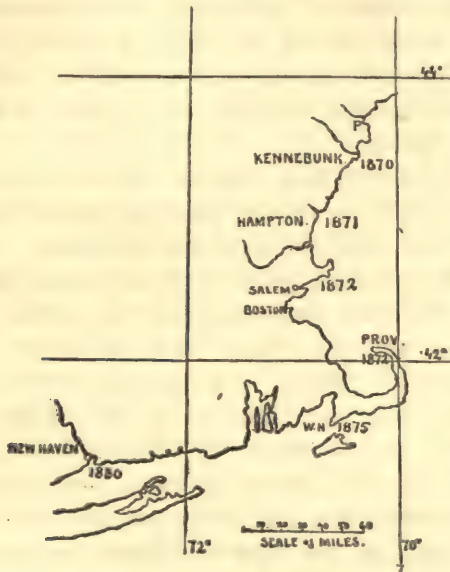
Professor Verrill, in a note to Silliman's Journal, for September, 1880, records his observations in regard to its diffusion, from which we quote the following :

"In 1873, it was collected in abundance at Saco, Me., by the U. S. Fish Commission, and was found sparingly at Peake's island, Casco Bay. In 1872, it was very rare at Provincetown, Mass., but in 1878, it was common there. In 1875, it was collected by the writer at Barnstable, Mass., on the shores of Cape Cod Bay, in large quantities. In 1879, it had become exceedingly abundant at Provincetown. In 1875, our parties found two specimens only on the southern shores of Cape Cod at Wood's Holl, but in 1876, it was found to be common there, and is now very abundant. The first specimen, found so far westward as New Haven, was obtained by Professor S. I. Smith, during the past winter. Other solitary specimens have since been obtained here by Mr. E. A. Andrews and by J. H. Emerton. It is at present exceedingly abundant at Newport, R. I."

In "Science News" for April 15, 1879, Mr. Arthur F. Gray comments on the occurrence of this species on the New England coast and gives a large number of places where it has been collected.

He first found it in Massachusetts, at Danvers, in the spring of 1872. He also mentions that Prof. J. W.

Chickering, jr., found it at Hampton beach, N. H., in 1871. The following rude map illustrates the gradual dispersion of this species from Maine southward, with the year of its occurrence marked at the different places.



EXPLANATION OF MAP.

P., Portland, Maine; PROV., Provincetown, Mass; W. H., Wood's Holl.

In 1872, it was observed simultaneously at Salem, Mass., and Provincetown on the end of Cape Cod. This Cape seemed to form a barrier for some time to its passage south, and after rounding the Cape, its progress was much slower. Its occurrence at Wood's Holl being observed in 1875, and only the past year had it got as far as New Haven.

A study of the ocean currents north of Cape Cod, which have a southerly course, will account for the rapid dispersal of this mollusk from Maine to Provincetown, Mass.; while the currents which set easterly south of

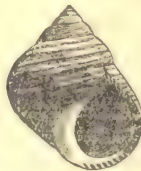
Cape Cod will account for its slower dispersion along the Connecticut shores.

It seems somewhat remarkable that this mollusk, for so many years an inhabitant of Nova Scotia and the Bay of Chaleur, should have been so long finding its way to the State of Maine. As far back as 1855, I received specimens of this species from Bathurst in the Bay of Chaleur.

The conditions are evidently very favorable for its existence along our shores, for it has increased in countless numbers, and the species seems to be fully as robust, and oftentimes exceeding in size its relatives in Europe.

Mr. Gray calls attention to the fact that this species, known under the common name of "periwinkle," forms an abundant supply of food to the poorer classes in Great Britain and Ireland, and there is no reason why the poorer classes here should not avail themselves of a mollusk so easily obtained.

Believing that, in past times as at present, the dispersion of forms took place in similar ways, it is interesting to look ahead to a time when the present mud and sand of the shores shall have been converted and consolidated into stratified rocks with the species entombed in a fossil condition. We may imagine a future Barrande finding material for an onslaught on the derivative theory by pointing to the abundant occurrence of this species in a narrow bed of rock of the same horizon and occurring over hundreds of miles of territory, when the beds just below reveal no vestige of this large and vigorous species.



*Littorina litorea*, Linn.

EXCURSION TO NEW CASTLE, N. H., FRIDAY AND SATURDAY, SEPTEMBER 10 and 11, 1880.

THE circulars, that were previously issued, announced that the excursionists would leave Salem on Thursday, the 9th inst., at 1.10 P. M., with the proviso of a postponement to the day following, if the weather should be unfavorable. Owing to the prevalence of a storm, the departure was deferred, and the party left on Friday, by the Eastern Railroad, reached Portsmouth at about 2.30, and at once took carriages to New Castle, making the Wentworth House, their headquarters. At the time of leaving Salem the weather had not entirely cleared, though indications were favorable and soon after the arrival at the place of destination, hopes were realized by the lightening up of the western sky and a glorious sunset was observed from the piazza. The effects of the storm were visible in all directions,—the dashing of the waves against the rocks, or rolling in on the beaches,—the wreck of a vessel breaking up, etc. Schooner *Eddie F. Hodgdon*, wood and slate laden, bound from Bangor to Boston, was compelled to anchor off Frost's Point, parted her cables, and the day before at noon drifted ashore, and became a total loss.

AN EVENING SESSION was held in the large music room at 8 o'clock. The PRESIDENT, in his introductory remarks, spoke of the great pleasure of coming to this old historic town, around which cluster so many interesting associations connected with the colonial and provincial periods of our history. These have been well described in the "Rambles about Portsmouth," by the late Charles W. Brewster, the first series published in 1859, the second in 1869, after the decease of the author. He alluded



to the meeting of the Institute held at Kittery, Me., on the other side of the Piscataqua river, in August, 1867; to visit, among other places of interest, the mansion once owned and occupied by Sir William Pepperell, the wealthy and enterprising merchant of the middle of the last century, who by his means and individual services contributed so largely to the capture of Louisburg, and was rewarded for his success and bravery with a baronetcy by George II.

In many of the old towns on the New England coast, the children, from the early settlement to the present time, have been wont to leave the old homesteads to colonize new places, or to seek the centres of trade, commerce or manufactures. We find them scattered over the vast territory extending from ocean to ocean, and from the Lakes to the Gulf, actively engaged in the various duties of life. Some visit the home of their ancestors and delight to examine the old records, and by diligent research and careful study endeavor to clothe in living forms this dead past. The collecting, arranging and preserving of the old papers and other relics, that will facilitate these researches, come within the province of the Institute.

Copies of extracts from some of the old documents in the office of the Registry of Probate for Essex county, were read to illustrate their character and the extent of the valuable material for history that may therefrom be gleaned.

VICE PRESIDENT F. W. PUTNAM was then called upon and gave a brief account of the Pueblo Indians of New Mexico and Arizona, illustrating his remarks by a series of large photographs taken by the government expeditions under Major Powell and Captain Wheeler. These

photographs showed the peculiar character of the houses, which consist of a number of rooms, placed side by side, and one over the other in three or four receding stories, the people living in the upper and outer rooms, while those which are dark and covered by others are used as storerooms. He showed how this plan of house-building had evidently been adopted as a means of defence, and how strongly fortified a town thus built was before the days of powder and artillery. The method of entering these houses was by placing a ladder from the ground to the roof, and so on from roof to roof. When the ladders were drawn up, the people were in comparative safety, and so long as provisions and water held out they could easily defend themselves before the days of gunpowder. These groups of houses often contained from 500 to 1,000 or more people; and while some, like the Pueblo of Taos, were built on the lowland and surrounded by an earth-wall, as a further means of protection, others, as the Pueblo of Acoma, were on high table-lands, or mesas, several hundred feet above the surrounding country, and could only be approached by narrow paths, which could be easily defended, when bows and arrows were the principal weapons. Some of these towns were, however, taken by the early Spanish leaders, and we have accounts of them as far back as the time of Coronado, about the middle of the sixteenth century. The Pueblo of Acoma, in particular, is interesting from the fact that it stands to-day, apparently unchanged, as it was first seen nearly three and a half centuries ago. The Pueblo of Zuñi is perhaps the best known of the southern towns in New Mexico, but as the present Pueblo, or New Zuñi, was built after old Zuñi had been taken by the Spaniards, it is of comparatively modern origin, although the people have, to a considerable extent, retained the

purity of their customs. The Pueblo of Taos, near the Rio Grande, has been often visited and described.

About Santa Fé, on both sides of the Rio Grande, there are many old pueblos, some of which are in ruins, while others have been, in great part, changed to Spanish-Mexican towns. In a few, however, the original inhabitants are still in the ascendancy. In many of the cañons and smaller valleys, and on many a mesa in New Mexico, Colorado and Arizona, as well as in southern Utah, and also to the south in Mexico, there are numerous ruins of once extensive towns, many of which have been described in the accounts of the various military and exploring expeditions. The "seven cities of Cibola," discovered by Coronado, have often been mentioned, and some writers have supposed them to refer to the ruins found by Lieut. Simpson in the Chaco cañon, a tributary of the San Juan, but the lecturer was inclined to argue with those writers who placed these "seven cities" in the region about, and including, old Zuñi.

The hundreds of ruins which are now known, including the singular cliff-houses or fastnesses, furnish the evidence of the former greatness of the pueblo people, and their wide distribution over a region which was probably once better adapted than now for the support of human life.

The lecturer then gave an account of the arts of the pueblo people, calling particular attention to the character of the pottery, of which he exhibited a number of specimens. This pottery differs widely from that found in the mounds and in other parts of the country to the east of the pueblo region, and is of a better type. That found about the ruins and belonging to the early period is baked harder, and in structure and ornament is far superior to that now made at the pueblos on the Rio Grande. That made at Zuñi, and the other southern pueblos, is more

like the old. The ornamentation is in color, generally black on white, or on red; occasionally a piece is found among the old fragments that has a glossy, bronze-like color. The decoration on the old pottery is principally made up of zigzag or geometrical figures; occasionally curved lines and scrolls were used. On the pottery now

FIG. 1.



COIL-MADE JAR FROM AN ADOBE RUIN IN SOUTHERN UTAH.

FROM A SPECIMEN IN THE PEABODY MUSEUM.

made at the pueblos on the Rio Grande, the ornamentation is more often black on a red ground, and many figures derived from contact with civilization have been introduced. On the recent pottery, animals are often rudely represented. The recent pottery is not so well baked as the old, and is in every way of an inferior character. A common method of making one kind of the oldest



pottery was by coiling the bands of clay upon themselves, and leaving the edges projecting. Pottery of this character is often farther decorated by pinching the edges, or by marking with the finger nail, or with a stick. A jar made in this way is shown in the engraving here intro-

FIG. 2.



PATTERNS ON ANCIENT PUEBLO POTTERY FROM THE SAN JUAN VALLEY.

FROM SPECIMENS IN THE PEABODY MUSEUM.

duced<sup>1</sup>, fig. 1; and some of the common forms of ornament on the smooth pottery are shown on the fragments represented by fig. 2.

<sup>1</sup> These illustrations were prepared for an article on Pueblo pottery in the *Art Review*, and by the kindness of the publishers of that journal, Messrs. Estes & Lauriat, of Boston, their use is allowed in this place.

After Mr. Putnam had closed his remarks, the company adjourned to the parlors where several choice selections of vocal and instrumental music were finely rendered by members of the Salem Oratorio Society and the Salem Schubert Club.

ON SATURDAY MORNING the sun rose clear and bright, and the party during the forenoon rambled about in various directions as inclination dictated. Several interesting places were visited: Odiorne's Point where M. Champlain landed in 1605, and the place selected by the Laconia company for the site of the first building erected on the grant, and it should therefore be venerated by every citizen of New Hampshire for the associations that cluster around this beginning of the state. At Frost's Point a fort was built soon after the settlement called Fort William and Mary; in 1775 fortifications were thrown up, and in the fort a company of artillery was stationed. In 1808, it was rebuilt under the name of Fort Constitution and remained until a new structure was commenced in 1863.

The lighthouse, the village, the village church, the burial ground,—were all noticed. New Castle is situated at the mouth of the Piscataqua river, at the entrance of Portsmouth harbor, some three miles from the city, formerly known as "*Great Island*." It was settled in 1623 and was a part of Portsmouth. In 1693 it was incorporated under its present name. The charter under the seal of William and Mary, written on parchment in old English black letter, is said to be still in the archives of the town. This was the home of the Jeffreys, Atkinsons, of John Frost who married Mary, sister of Sir William Pepperell, a family of the Prescotts and other honored names.

At 3 p. m., adieu was said to mine host of the Wentworth House; the delightful situation, picturesque scenery and surroundings, with first-class hotel appointments, have given to this house a prominent place among the seaside resorts of New England. On the way to the railroad station in the city, tarried for an hour at an old mansion,

THE HOMESTEAD OF GOV. BENNING WENTWORTH, who built it in 1750, and occupied it until the termination of his commission in 1767. Situated at Little Harbor about two miles from the centre of Portsmouth near the bank of the river, it commands an extensive view of Portsmouth, the navy yard, and adjacent and opposite shores.

Mr. William P. Israel, the present owner, conducted the party through the several apartments, pointing out the various objects of interest and referring briefly to some of the old historical associations. The following may be specified :

The council chamber, finished in the best style of the last century, an imposing and high-studded room, where meetings of the council were held, for many years; also the little side rooms. Ascending a short flight of steps is the spacious parlor, rich in its original finish.

In these various rooms were collected many interesting and curious objects; pictures, a spinet, furniture, etc., that would require considerable time to, carefully, examine. The most notable of the pictures was a painting, by Copley, of Dorothy Quincy, who became the wife of John Hancock, and afterwards Madam Scott.

Leaving the old mansion, the party proceeded to the cars and took the 5 o'clock train for Salem, arriving at 6.35 in the evening.













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